WESTERN GAS

October
1931

20 Cents
the Copy

13th Annual Convention
American Gas Association
Atlantic City
.... October 12-16

A MONTHLY JOURNAL DEVOTED TO THE
WESTERN GAS & APPLIANCE INDUSTRIES

PRINT IN BINDING

THE PERFECT APPLICATION OF A PRINCIPLE

MERCO

Illustration shows valves in gas transmission lines in a Regulator Station—Nordstrom equipped.

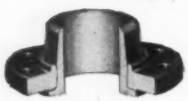
Positive shut-off absolutely necessary on natural gas lines

On transmission and distribution lines, regulator lines, by passes, etc., the absolute necessity of obtaining perfect shut-off makes the use of Nordstrom Valves almost compulsory. Utilizing the plug cock principle in combination with the patented Nordstrom "Sealdport" lubrication, a valve assembly is provided that guarantees against leaks, regardless of pressure with the line. The valve is always easy to open or close and a quarter turn completes the operation from full open to full closed. The principal gas lines installed for years past are Nordstrom equipped. Catalog No. 8 describes the various types of valves used in the gas industry and gives interesting information that every engineer should have. It will be forwarded upon request.

QUARTER TURN COMPLETELY OPENS OR CLOSES VALVE. PLUG HELD IN SEAT BY COMPRESSIBLE PACKING UNAFFECTED BY FLUID OR GAS IN LINE.

SPECIAL "MERCO" LUBRICANT SUPPLIED FOR EACH SPECIFIC SERVICE.

"SEALDPORT" LUBRICATION FORMS PRESSURE SEAL OF LUBRICANT AROUND EACH PORT.



"Merco" Swivel Flanges —the latest development in flange design for welded pipe. Ask for information.

MERCO NORDSTROM VALVE COMPANY

SUBSIDIARY OF THE MERRILL COMPANY . . . ENGINEERS

Atlanta - Healey Bldg.
Boston - 250 Stuart St.
Buffalo - 1 W. Genesee St.
Charleston - W. Virginia
Chicago - 176 W. Adams St.
Dallas - Magnolia Bldg.
Detroit - 2842 W. Grand Blvd.
El Paso - 111 So. Virginia St.
Houston - Petroleum Bldg.
Los Angeles - 1709 W. 8th St.
New Orleans - Masonic Bldg.
New York - 11 W. 42nd St.
Pittsburgh - Clark Bldg.
St. Louis - 317 N. Eleventh St.
San Francisco - 343 Sansome St.

Agencies:

Denver - Republic Supply Company, 332 Continental Oil Bldg.
Honolulu - W. A. Ramsay Co., Ltd., Fort & Queen Streets
Philadelphia - Brown, Wilson & Company, 1600 Arch St.
Saginaw - Arthur C. Beckert, 112 Durand St.
Salt Lake City - National Equipment Co., 101 West 2nd South St.
Tulsa - B. V. Emery & Company, 216 E. Brady Street

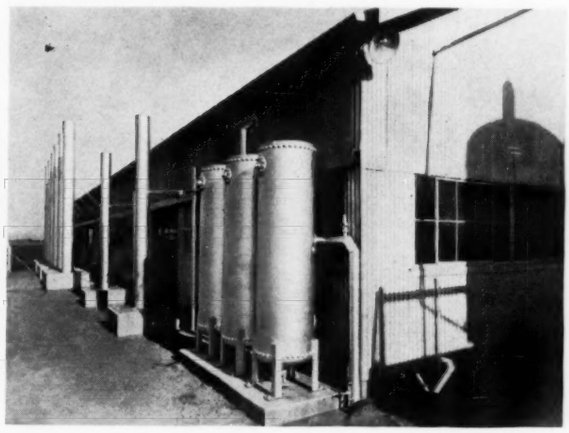
Factory - Oakland, Calif.

Canada - Peacock Bros., Ltd., Montreal, Toronto, Winnipeg, Vancouver. (Also Sydney, N. S.)
England - Audley Engineering Co., Ltd., Newport, Shropshire.
Buenos Aires, Argentine - General Electric, Soc. Anon., Victoria 618 Esq. Peru.

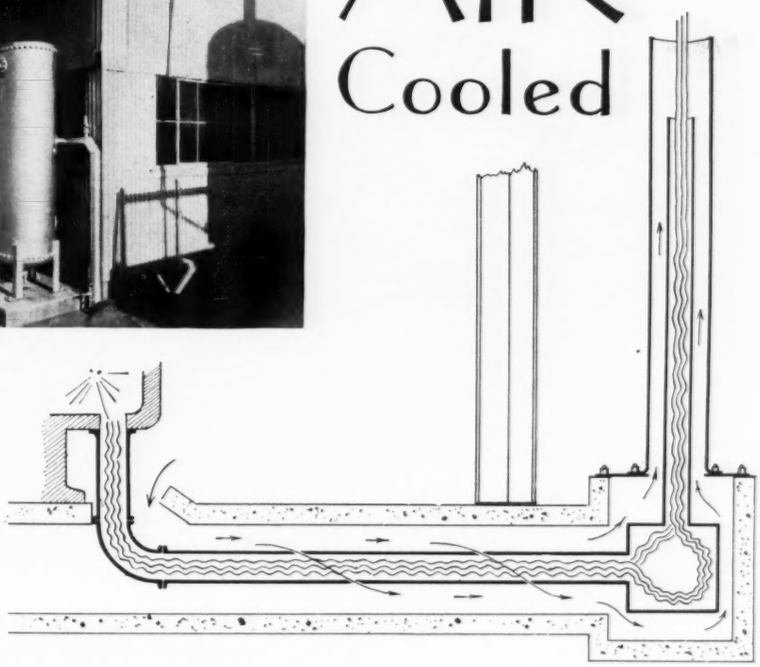
NORDSTROM VALVES

Mufflers and Exhaust Lines

AIR Cooled



. . . Battery of air cooled twin mufflers on three 200 HP gas engine compressors and auxiliary engines.



The above sectional drawing shows the jacket covering the exhaust line. Arrows indicate the flow of air which completely envelops the line.

7 Reasons why this new FLUOR method is more economical - - -

1. This new air suction method affords positive engine room ventilation.
2. Elimination of all troublesome water connections.
3. Positive freedom from water loss.
4. Elimination of water condensation on nearby equipment.
5. Quiet operation.
6. Automatically cooled exhaust lines.
7. Low first cost.

The application of the air cooled muffler principle has been successfully developed by Fluor to cover all types of gas engines. The exhaust line from the engine runs under the floor in an enclosed trench, to the muffler. The air inlet to the trench is baffled to insure proper velocity and air flow across the engine. Muffling action takes place in a baffle type cylinder. The exhaust discharging into the outer stack creates a steady suction, drawing in at the cylinder head an abundance of air which sweeps through the jacket, thereby affording the exhaust line a constant bath of cool air. ¶ Fluor engineers are continually engaged in the problems of mechanical efficiency. This air cooling process is one of their latest contributions. Whatever your problems in designing, building, plant moving, installation, let Fluor engineers assist you. They use every economy.

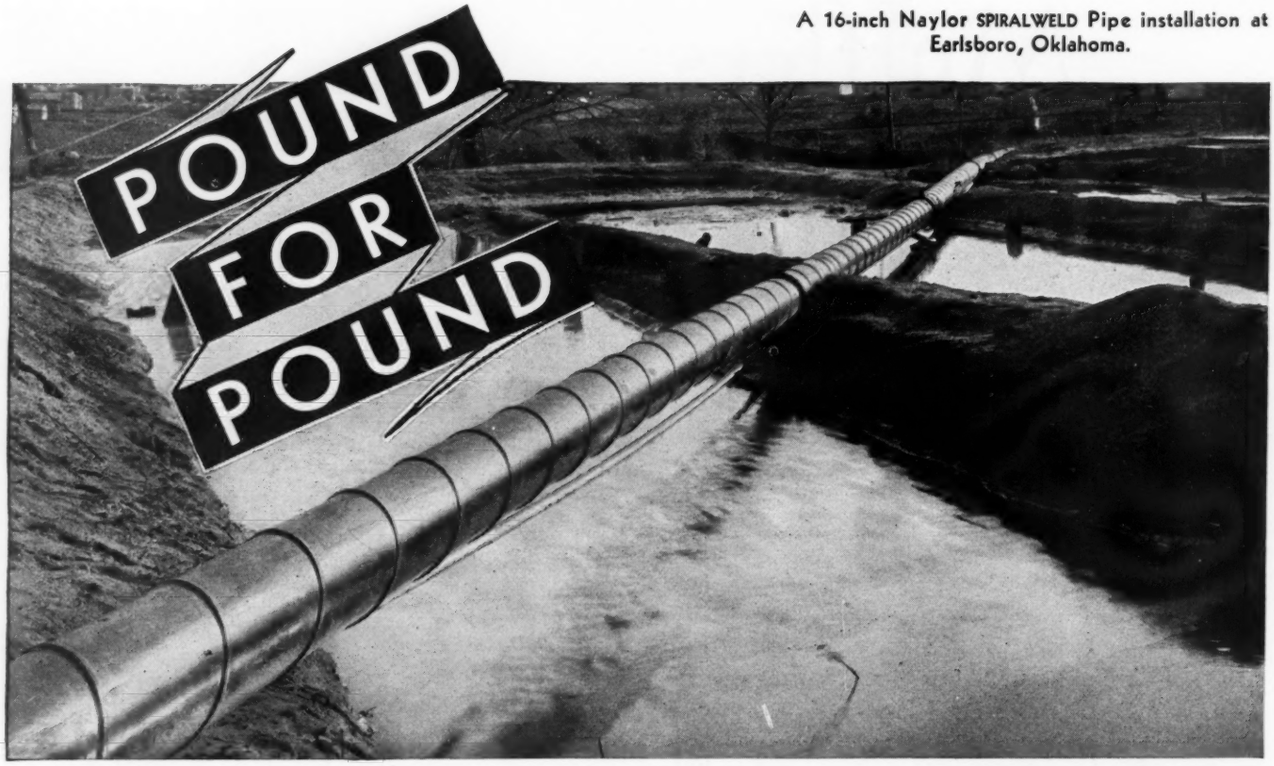
THE Fluor CORPORATION, LTD.

909 East 59th Street ◆ Los Angeles, Calif.

TULSA, OKLA. 11 EAST FIFTH AVENUE
NEW YORK, N. Y. 30 CHURCH STREET
DALLAS, TEX. MAGNOLIA BLDG.
KANSAS CITY, MO. 503 FAIRFAX BLDG.

October, 1931, Volume VII, Number 10, Western Gas is published by Western Business Papers, Inc., at 124 West Fourth Street, Los Angeles, California. Subscription price (in advance) 20 cents the copy; $2.00 per year; 2 years, $3.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, under the Act of March 3, 1879.

A 16-inch Naylor SPIRALWELD Pipe installation at Earlsboro, Oklahoma.



Naylor *SPIRALWELD* Pipe Is The *Strongest!*

THE strength of Naylor SPIRALWELD Pipe is an inherent structural advantage, assured by the *exclusive* Naylor electrically welded spiral lock-seam truss. The added strength of this truss makes possible the greatest strength, pound for pound, ever built into a pipe structure!

Because of its exceptional strength, Naylor SPIRALWELD Pipe is being used successfully for the same pressures as standard weight wrought Pipe—*yet it weighs one half as much!* The Naylor electrically welded spiral lock-seam truss not only provides maximum structural strength but minimum weight as well. And, a strong, light weight pipe—such as Naylor SPIRALWELD Pipe—is always a good pipe investment.

TRADE MARK
NAYLORPIPE

PIPE CARRIED IN STOCK AT CHICAGO, HOUSTON AND LOS ANGELES

Proved Naylor SPIRALWELD Pipe advantages for air, water, gas and oil lines:

STRENGTH
FLEXIBILITY
LONG LIFE
LIGHT WEIGHT
WELD STAMINA
PERFECT ROUNDNESS

NAYLOR PIPE COMPANY

Main Office & Plant, 1230 East 92nd Street, Chicago

SALES OFFICES

NEW YORK
3116 Chrysler Building

PHILADELPHIA
Witherspoon Building

TULSA
507 Philtower Building

HOUSTON
2301 Commerce Street

DALLAS: 305 Magnolia Building

LOS ANGELES: Champion & Barber, Inc., 576 Subway Terminal Building., Exclusive Distributors: California, Nevada and Arizona

MONTREAL, CANADA: Mechanical Equipment Company, 660 St. Catherine St., West

VANCOUVER, B. C.: Gordon & Belyea, Ltd., 101 Powell Street

MARACAIBO, VENEZUELA: Patrick H. Heeney, Apartado 298

MEXICO: C. H. Elstner, Apartado 284 Monterrey N. L.

BUENOS AIRES, ARGENTINA: H. A. W. Myrin, San Martin 66

TRINIDAD B. W. I.: Massy, Ltd., Port au Spain

MAKE YOUR HIGH PRESSURE POSITIVE METERS DIRECT READING

CORRECTED VOLUME

METERED VOLUME UNDER SHUTTER

With an

EMCORECTOR*

The EMCORECTOR replaces the conventional pressure and volume gauge as generally used on high pressure meters. It gives a DIRECT READING of VOLUME CORRECTED to any base pressure, regardless of line pressure fluctuations. This eliminates the time and expense involved in making chart calculations.

The correction is made automatically on small increments, thus obtaining an accuracy not possible under the chart observation method of correction.

*The EMCORECTOR is fully covered by Patent Number 1,230,583 and other patents pending.

PITTSBURGH EQUITABLE METER COMPANY

Main Office and Factories—Pittsburgh, Pa.

NEW YORK TULSA SALT LAKE CITY LOS ANGELES COLUMBIA CHICAGO
DAVENPORT DALLAS SEATTLE HOUSTON KANSAS CITY

testing springs

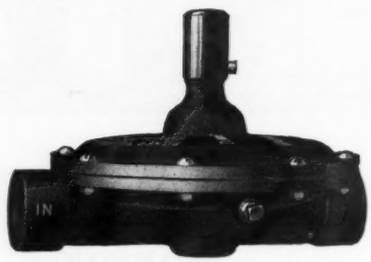
to assure more sensitive and dependable control

This test is made to determine the characteristics of the springs used in Fisher Specialties—to ascertain the deflections at various loads and prepare the Spring Charts that assure the avoidance of loadings that would cause springs to take a permanent set. The test is also used as a check on standard springs purchased from other spring manufacturers.

But all this is only a means toward an end—the end of making certain that Fisher Specialties are more accurate, more sensitive and more dependable than was previously thought possible of any fluid control equipment.

The spring test is further proof of the fact that Fisher takes nothing for granted—that no details are overlooked in building Fisher Specialties so that they will always continue to be the standard of comparison.

FISHER GOVERNOR COMPANY
2400 Fisher Building Marshalltown, Iowa



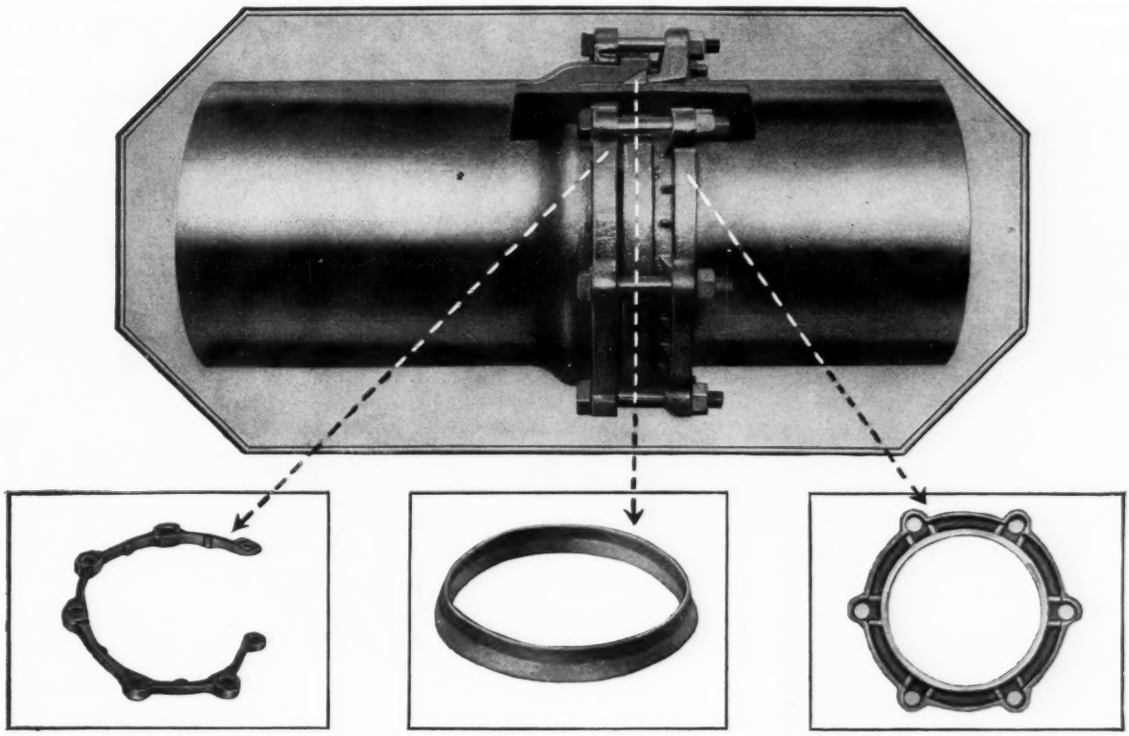
The Fisher Type 725 House Service Regulator reduces high initial gas pressures (1 to 300 lbs.) to inches of water. It has distinctive features that make it more sensitive, while its extreme simplicity and rugged construction assure trouble-free operation and long life. This is not a stock "regulator"—it is "custom built" to suit the specific operating pressures and the natural gas, manufactured gas, or propane, etc., for which it was ordered. Write for a copy of circular No. 805.

FOR 50 YEARS

FISHER

THE MARK OF SCIENTIFIC FLUID CONTROL

This gas-tight ANTHONY JOINT
saves installation time



Only 3 parts to assemble

ENGINEERS seeking a gas-tight joint which can be quickly and easily assembled should investigate the Anthony Joint as developed and perfected by the U. S. Pipe and Foundry Company. No troublesome details about the Anthony Joint; no complicated adjustments. Simply place one gasket, tighten two rings and your joint is complete.

The Anthony Joint will remain bottle tight under high pressures too. One gas superintendent writes: "We regard deLavaud Pipe with the Anthony Joint ideal . . . The installation was subjected to 250 pounds gas pressure for four days . . . Since then, the daily pressure is from 90 to 125 pounds." Unusual deflection is another advantage which the Anthony Joint offers. With this joint you can install a line in surprisingly steep or rolling country — without the aid of bends or special fittings.

The Anthony Joint is offered in either deLavaud centrifugally cast pipe or in pit cast pipe and fittings. All rings, bolts and gaskets are interchangeable. Of special interest is the fact that Anthony Joint bends, tees and other fittings can also be used with plain end pipe. Let us send you complete information regarding the many advantages which this new joint offers.

United States Pipe and Foundry Co., Burlington, N.J.

Sales Offices:
New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

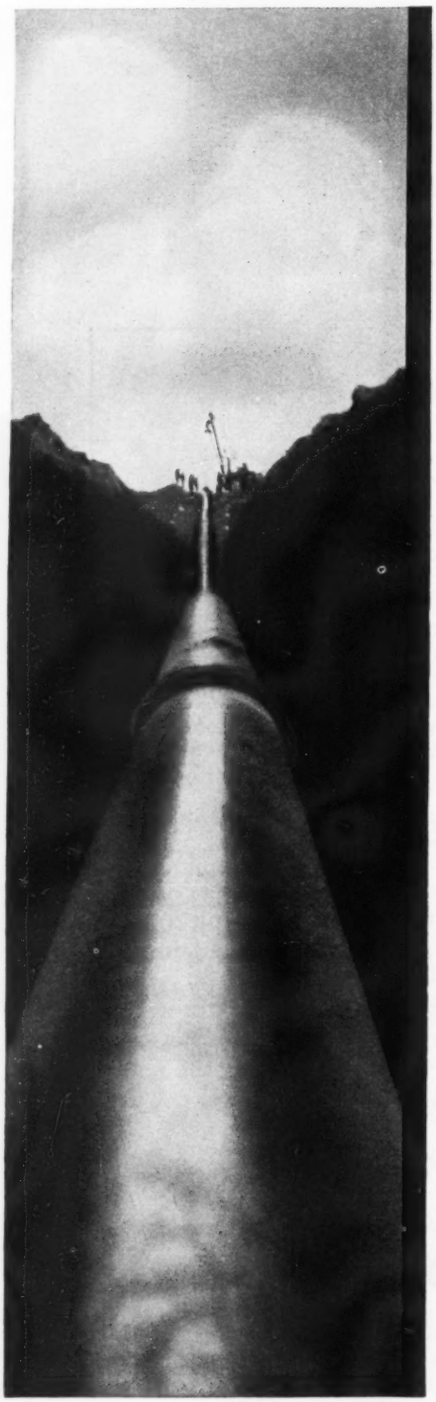
Our pipe bears the "Q-Check" trademark of The Cast Iron Pipe Research Association

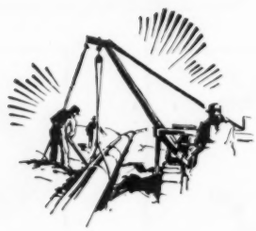
YOUNGSTOWN

Visit our booth No. 134 at the American Gas Association Convention, Atlantic City, Oct. 12-16

Electric Weld

Hundreds of miles of this 20" Youngstown electric weld pipe connect the oil and gas producing fields of the United States with consuming cities.





FOR PERMANENT PIPE LINES

THIS PIPE, manufactured from a special-process steel, offers new standards in both performance and field handling. It is strong and durable, uniform in diameter throughout its lengths, exceptionally straight and round, mechanically descaled and easy to weld and assemble in the field. No other line pipe can offer greater endurance, easier handling or greater value.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

One of the oldest manufacturers of copper-steel, under the well-known and established trade name "Copperoid"

General Offices — **YOUNGSTOWN, OHIO**

Distributors:

CONTINENTAL SUPPLY CO. *1501 Locust St., St. Louis, Mo.*

INTERNATIONAL SUPPLY CO. *Tulsa, Okla.*

REPUBLIC SUPPLY CO. *2122 East 7th St., Los Angeles, Cal.*

YOUNGSTOWN

FROM ORE MINE TO GAS LINE

One-piece Ironcase Casting

Eliminates the possibility of Internal Case Leaks

OF GREAT IMPORTANCE to the accuracy of any displacement meter is the construction of the case. In Metric Ironcase Meters, the valve table, partition and channels are cast as an integral part of the body. There can be no internal leakage between measuring compartments.

Even a minor internal leak can make a meter incapable of measuring a pilot light load. For that reason, all meters are given a rigid low fire test before leaving our factory. And the test record of Metric Ironcase Meters with their leak-proof one-piece bodies, proves convincingly the value of this important structural improvement.

The one-piece principle of Metric construction is illustrated by the cross-sectional view of the 5-B body casting. This advantage is available in every Ironcase meter which includes 5-B, 10-B, 20-B, 25-B, 30-B, 35-B, 60-B, 80-B, 250-B, and 500-B.

Write for our Ironcase Catalog EG-40.

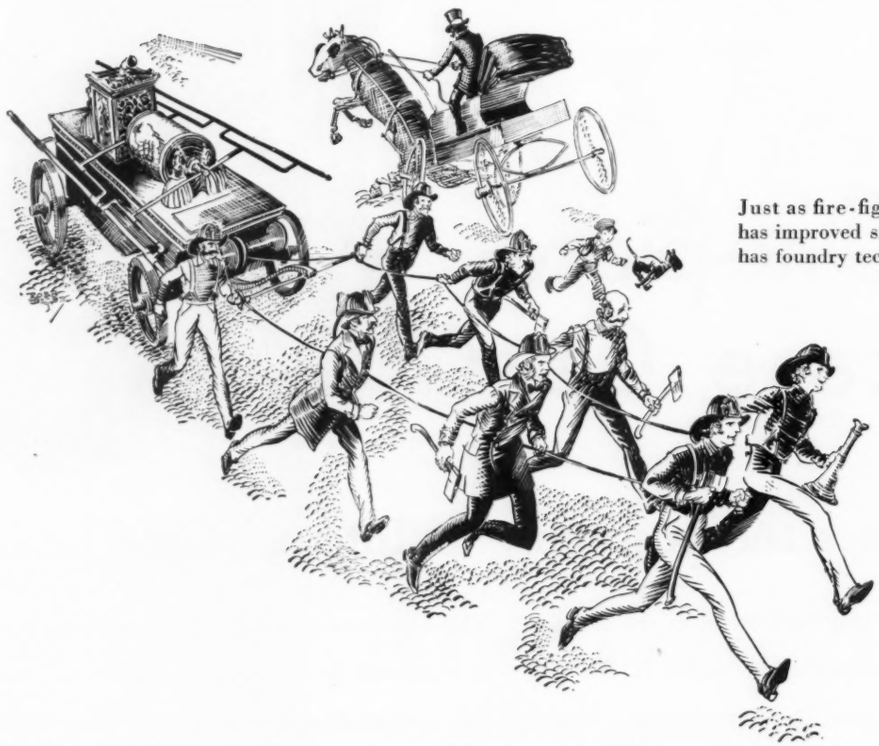
AMERICAN METER CO. MEASUREMENT ENGINEERS CUBIC FEET

METRIC METAL WORKS
ERIE, PENNSYLVANIA
IRONCASE, TINNED STEEL CASE and ORIFICE METERS

AMERICAN METER COMPANY
INCORPORATED
The World's Largest Manufacturers of Gas Meters and Allied Apparatus
ESTABLISHED 1836

SALES · ERIE · DALLAS · TULSA · DENVER · LOS ANGELES · SAN FRANCISCO · KANSAS CITY
SERVICE · PITTSBURGH · CHICAGO · PHILADELPHIA · NEW YORK · BALTIMORE · BOSTON · ALBANY

CHARLESTON'S 93-year-old Gas Mains are good *but* to-day's Cast Iron Pipe is even better



Just as fire-fighting apparatus has improved since 1838, so also has foundry technique advanced.

WHEN the city fathers of Charleston, S. C., put down a cast iron gas line in 1838 they never dreamed of motorized fire engines or that those gas mains would still be serving 93 years later. The quality of old-time cast iron mains laid three generations ago in Charleston and many other cities was evidently remarkable. In 44 principal cities the age of the oldest cast iron gas mains in service averages over 64 years, and 70 per cent are *original* mains.

But just as fire-fighting apparatus has improved since 1838, so also has foundry technique advanced. Today, gas engineers are offered cast iron pipe of higher, more uniform quality, as well as efficient mechanical joints for high pressure distribution. For further information regarding the advantages of specifying modern cast iron pipe for modern gas mains as well as for water, and sewer lines, road culverts and industrial needs, address The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, 309 Peoples Gas Building, Chicago, Ill.

Efficient mechanical joints for cast iron gas mains are now in use and obtainable for high-pressure gas distribution.

CAST IRON PIPE

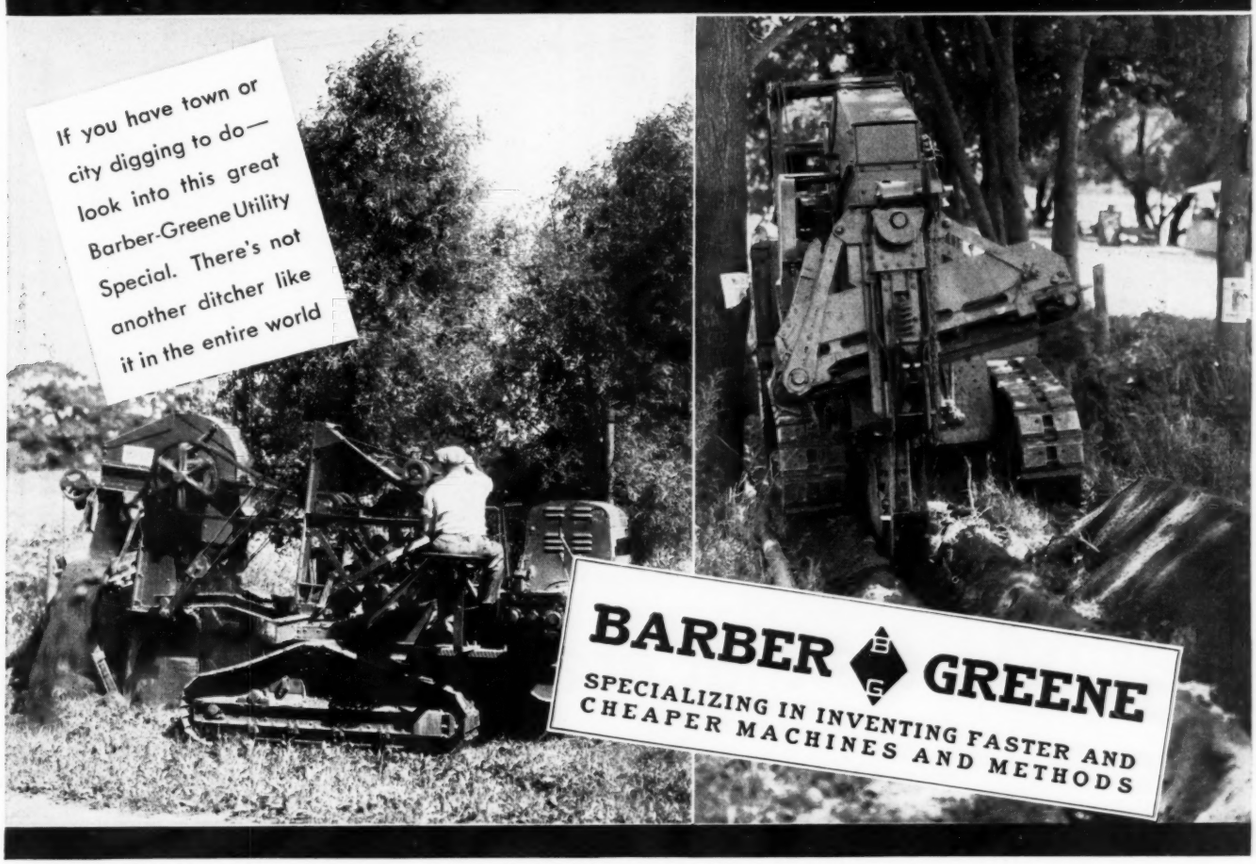
Cast iron pipe bearing the "Q-check" trademark is obtainable from the following leading pipe founders: Alabama Pipe Company, Anniston, Ala.; American Cast Iron Pipe Company, Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Ave., Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe and Foundry Company, Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Pipe and Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Corporation, 11 Broadway, New York.

Reg. Trade Mark

CAST Q IRON

The "Q-check" symbol shown above is the registered trademark of The Cast Iron Pipe Research Association.

The Only Ditcher with Offsetting Vertical Boom


If you have town or city digging to do— look into this great Barber-Greene Utility Special. There's not another ditcher like it in the entire world
BARBER GREENE
SPECIALIZING IN INVENTING FASTER AND CHEAPER MACHINES AND METHODS

There is not another ditcher in the entire world like this Barber-Greene Utility Special Ditcher.

It is the only ditcher with an offsetting *vertical* boom that leaves no ramps for shovelers — that jumps walks and curbs cleanly. And the offsetting feature permits you to dig close to trees, curbs, poles and fences. What's more, the B-G Boom offsets with a simple crank—even while the machine is digging.

No other offsetting boom ditcher is so narrow. Width is only 69 inches.

No other offsetting boom ditcher is so short, so compact, so easy to handle. Overall length is only 181 inches.

No other has the B-G delayed bucket kick-out, which puts all spoil on the conveyor. Goodbye spillage.

No other has milling action digging, which walks through macadam, frozen ground, hard pan and similar things at which ordinary ditchers cough apologetically and stop.

No other has the patented *Mechanical Brain*—B-G Overload Release Sprocket—which protects underground pipes and the machine itself. It trips when the digging teeth hit anything unusual and picks up the load automatically if you decide to go through.

And the operator gets a wide range of mechanical digging speeds. Fifteen are at the operators fingertips. Many more are available through sprocket changes.

As for construction — try to match it anywhere.

Bucket Chain is identical with that used on all Barber-Greenes.

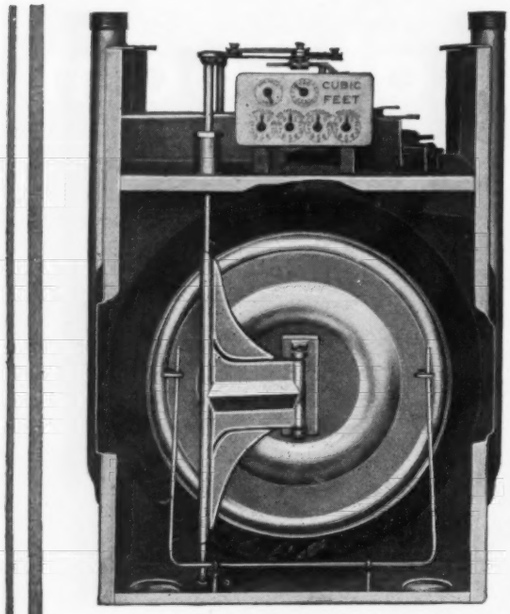
Transmissions are enclosed, running in oil. Boom raises by power. Spoil conveyor is adjustable and reversible. Follow-up scraper insures a clean ditch. Crawlers are full length with low ground pressure and automatic take-up. Big 38 h. p. engine provides one h. p. for every 290 pounds of weight.

STANDARDIZED MATERIAL HANDLING MACHINES

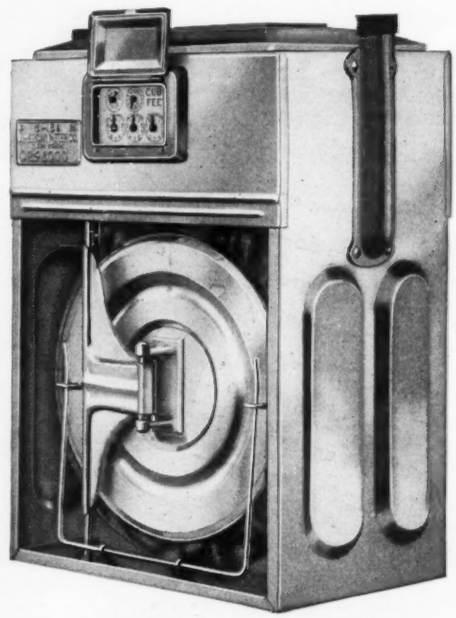
BARBER-GREENE **712 WEST PARK AVENUE, AURORA, ILLINOIS**

Bucket Loaders
Coal Loaders
Snow Loaders
Trailers
Loaders with Weighing and Batching Hoppers
Loaders with Vibrating and Grizzly Screens
Coal and Coke Car Unloaders
Permanent Belt Conveyors
Portable Flight Conveyors
Standard Gas and Water Ditchers
Pipe Line Special Ditchers
Belt Car Unloaders
Portable Belt Conveyors
Self-Propelled Flight Conveyors
Utility Special Ditchers
Service Special Ditchers

Also C type meters (tinned steel case). Capacity range—600 to 17,500 cubic feet per hour. Six sizes.
Metric Iron Case Meters, Orifice Meters and Testing Apparatus



A type meters (tinned steel case). Rated capacity range—175 to 3400 cubic feet per hour at ½" differential. Five sizes.



B type meters (tinned steel case). Rated capacity range—150 to 7500 cubic feet per hour at ½" differential. Eight sizes.

Gas Meters that are not duplicated

AMERICAN METER COMPANY Gas Meters have every known requirement for true economy.

Collectively, these meters cover the entire range of Gas Company needs for measuring manufactured or natural gas. The line is complete. And the varying requirements of each section of the country are served by a manufacturing plant or a service station located in that area.

Individually, each meter has every quality necessary for accuracy and dependability—proper design and construction—proper metallurgical composition of parts—precise assembly—efficient operation.

Only an exact duplication of each feature in every detail can give an equivalent value.

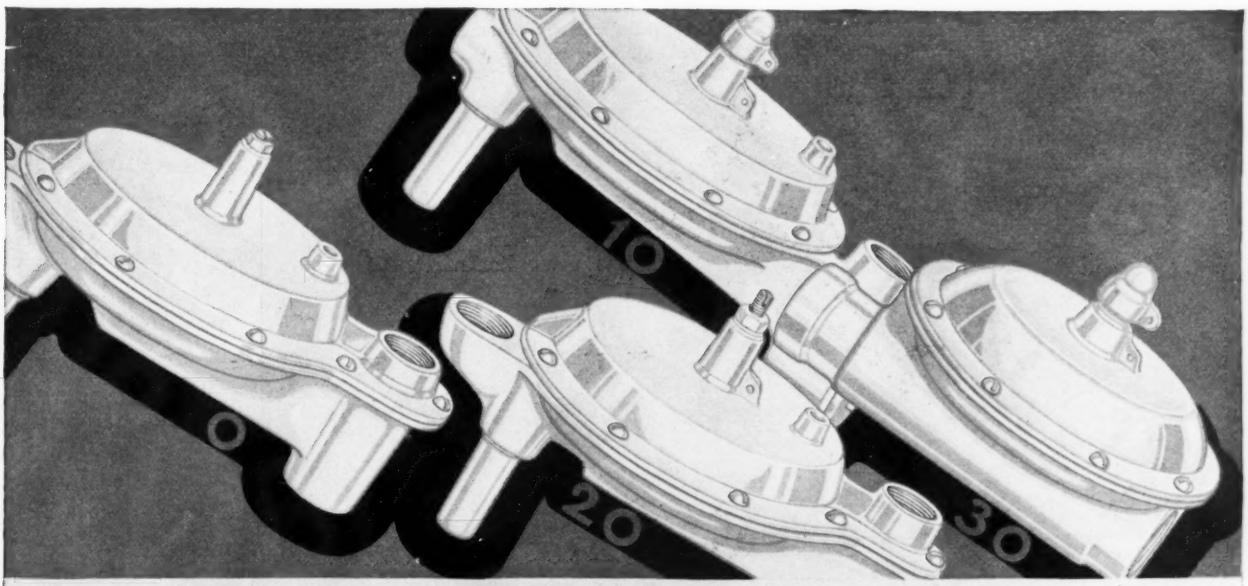
High quality is true economy. American Meter Company Gas Meters will measure your Gas at lower cost. A nearby representative will be glad to discuss this with you.

AMERICAN METER COMPANY
INCORPORATED
The World's Largest Manufacturers of Gas Meters and Allied Apparatus
Established 1836
GENERAL OFFICES : 105 W. 40TH STREET · NEW YORK, N.Y.

AMERICAN METER COMPANY
JOHN J. GRIFFIN & COMPANY
HELME & MCILHENNY
MARYLAND METER WORKS
D. MCDONALD & COMPANY
METRIC METAL WORKS
NATHANIEL TUFTS METER WORKS
PACIFIC METER WORKS

AMERICAN METER CO
MEASUREMENT ENGINEERS
CUBIC FEET

SALES SERVICE ALBANY · BALTIMORE · BOSTON · CHICAGO · DALLAS · DENVER · ERIE · KANSAS CITY · LOS ANGELES · NEW YORK · PHILADELPHIA · PITTSBURGH · SAN FRANCISCO · TULSA



Reynolds Service Regulators

Models ~ 0 ~ 10 ~ 20 ~ 30

Because maintenance policies usually warrant the specification or continuance of particular types of Gas Control Units, REYNOLDS offers a complete line of service regulators, built to meet the specific requirements of the user.

Illustrated at the right are the four models: 0, 10, 20 and 30. Their individual features are listed alongside of each one. Model 30 Toggle Type is offered in seven styles (Catalog K, Section 4, carries the complete story of this new Regulator).

WRITE FOR DETAILS

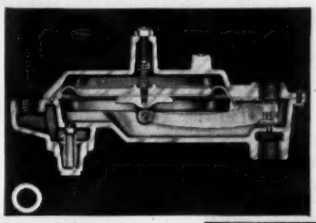
REYNOLDS GAS REGULATOR COMPANY

ANDERSON, INDIANA

Branch Offices: 422 Dwight Building, Kansas City, Missouri
Second Unit, Santa Fe Building, Dallas, Texas

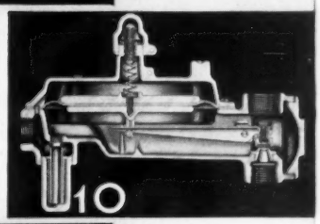
REPRESENTATIVES

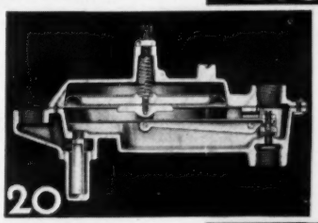
Eastern Service Company, Boston, Massachusetts F. E. Newberry, Avon, New Jersey



Model 0. Spring Type, with or without Mercury Seal. The old standard has served successfully for a quarter of a century.

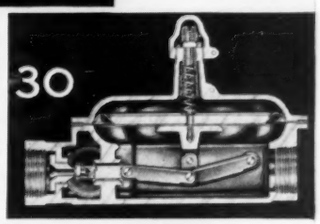
Model 10. Dead Weight or Spring Type, with or without Mercury Seal. All working parts are so accessible as to be interchangeable without removal from pipe line.





Model 20. Dead Weight or Spring Type, with or without Mercury Seal. All working parts are so accurate as to permit complete interchangeability in shop.

Model 30. R-8100-B-9 for horizontal connections, with or without removable valve pocket. Available with either Spring or Dead Weight adjustment. With or without Mercury or Dead Weight Safety Seal. Built for vertical connections, with or without Spring or Dead Weight adjustment.



Recognized Leadership In GAS CONTROL SINCE 1892

District Offices:
J. D. SWARTZ,
1231 S. Evanston Street,
Tulsa, Oklahoma

E. L. MOSELY,
2218 Mills Street,
Houston, Texas

District Warehouses:
Houston, Texas; Thenard, Calif.;
180 Townsend St.,
San Francisco, California

Distributors:
UNITED OIL WELL SUPPLY CO.
712 A. G. Bartlett Bldg.
Los Angeles, Calif.

UNITED PIPE & SUPPLY CO.
Charleston, Danville,
West Hamlin, W. Va.
Paintsville, Ashland, Allen
Prestonburg, Ky.

PRICHARD SUPPLY CO.
Mannington, W. Va.; Mather &
Waynesburg, Pa.

LeVALLEY, McLEOD, KINKAID CO., Inc.
Elmira and Olean, N. Y.

KANE SUPPLY COMPANY
Kane, Lawrenceville,
Brookville, Pa.

PELICAN WELL TOOL & SUPPLY CO.
Shreveport, La.; Kilgore, Texas

LOUISIANA IRON & SUPPLY CO.
Shreveport, La., Henderson &
Kilgore, Texas

GREAT NORTHERN TOOL & SUPPLY CO.
Billings & Kevin, Mont.
Kemmerer & Cody, Wyo.

No Leaks in the Final Test.

Another successful line completed with Chester double length line pipe and another satisfied customer. NOT A LEAK DEVELOPED IN THE FINAL TEST. When you purchase Chester line pipe you purchase pipe with good bending qualities and yet it has a high tensile strength to resist unusual pressures.

Chester also makes all classes of Genuine Wrought Iron Tubular Goods and Copper Bearing Steel Pipe.

SOUTH CHESTER TUBE COMPANY
Chester, Pa.

District Sales Managers:
J. P. COONEY
715-716 A. G. Bartlett Bldg.
Los Angeles, Calif.

H. A. MORSE
30 Church St., New York, N. Y.

W. E. GIPSON
801 Columbia Bank Bldg.
Pittsburgh, Pa.

J. P. STEELE
305 Petroleum Bldg.
Fort Worth, Texas

CHESTER

STEEL CASING

SPECIALISTS IN CASING FOR DEEP WELL DRILLING

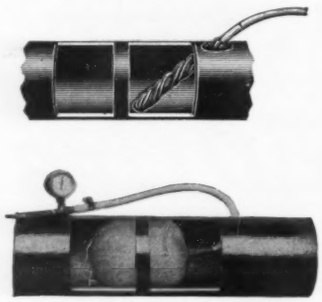
LINE PIPE

"Gas for CHICAGO" meant a DRESSER-COUPLED Line
A BOLD plan realized. The Texas-Chicago line. Nearly a thousand miles of 24-inch pipe operating under pressures up to 800 pounds. Construction and upkeep expense held at the lowest practicable minimum because of Dresser Couplings—used for speed and ease of joint-making, for continued flexibility, for permanent tightness. The long gas lines are always Dresser-Coupled.
THE S. R. DRESSER MFG. CO.
Bradford, Pa.
DRESSER COUPLINGS Dominate!

—STOPPERS SINCE 1897—

SEE US AT BOOTH 135.

TYPE "C" CANVAS-COVERED GAS MAIN BAGS



SIZES 2" to 48"

For use in mains coated with tar or oil or wherever a plain rubber will not hold.

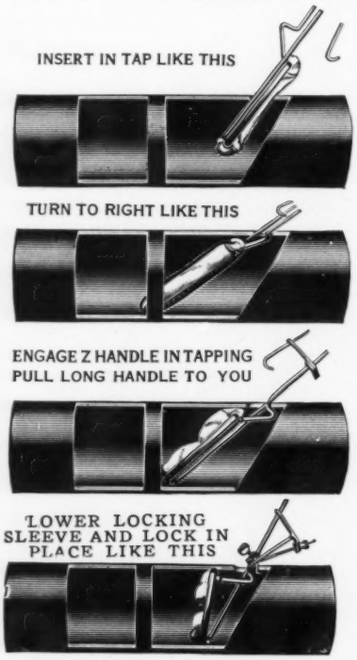
DEPENDABLE GAS MAIN BAGS

Made in three types:

Light—Type "A"
Medium—Type "B"
Extra Heavy—Type "D"

We advise the use of a gauge showing the internal pressure in the bag. It prevents over-inflation and shows that the bag is holding.

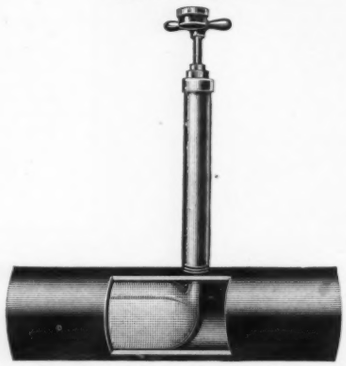
HOW TO USE THE GOODMAN STOPPER


INSERT IN TAP LIKE THIS
TURN TO RIGHT LIKE THIS
ENGAGE Z HANDLE IN TAPPING
PULL LONG HANDLE TO YOU
LOWER LOCKING SLEEVE AND LOCK IN PLACE LIKE THIS

WHEN LOCKED IN PLACE IT HOLDS

Takes only 30 seconds

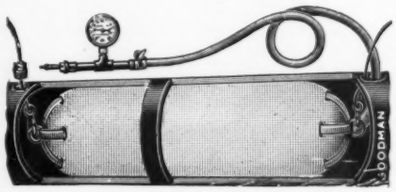
THE GARDNER-GOODMAN STOPPER



A new stopper for low and intermediate pressures.
For use on cast iron or steel, oversize or undersize mains.
Easily inserted in top, bottom or side of main, in open excavation or under pavements.
For pressure work, use two or more Stoppers in parallel.

GOODMAN CYLINDRICAL STOPPER FOR INTERMEDIATE PRESSURE

To place and inflate requires less than one minute.



Patented

Increased Length for Increased Pressure

AIR-LINE MASK

With or without blower. Heavy harness and life-line if needed.

SPRING-HEEL PLUG

Type No. 6 for right angle fittings.

Type No. 7 for 45° fittings.

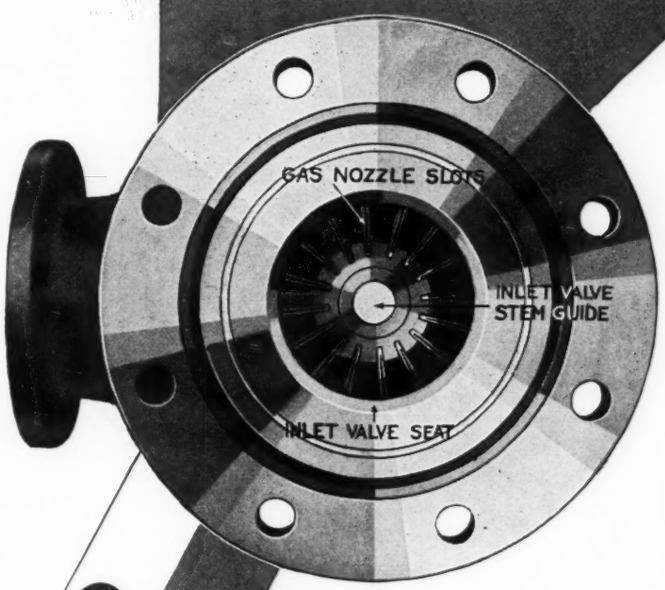
Other Plugs for Various Uses

Safety Gas Main Stopper Company

523 Atlantic Ave. **Cable Address** **Gastopper, N. Y.** Brooklyn, N. Y.

Pacific Coast Representative—C. B. Babcock Co., 135 Bluxome St., San Francisco, California

RASIGA



Inlet Valve, Gas Nozzle Arrangement

AIR GAS

THE above is an attempt to illustrate a complete mixture of the letters in the two words AIR and GAS. With letters the problem is simple; with actual air and gas, the problem was more complex.

We have always been insistent on a homogeneous mixture, because our experience has been that a gas engine is just about as efficient, economical and generally satisfactory as its mixture is perfect. Back-firing, missing, overheating and difficulty in starting are very generally experienced just in the degree that the mixture is imperfect.

The TRANSIT 17 x 24" Gas Engine-Gas compressor has been put through many tests, and all the data and evidence proves a complete mixture of air and gas.

Gas and air are each piped separately from the regulating valve to each of the inlet valves, one of which is illustrated at the left. The vacuum produced on the intake stroke draws in the air over and around the gas nozzles projecting into the air stream, and the correct amount of gas as metered by the regulating valve, is drawn into the air stream through the long narrow slots of the gas nozzles in the form of thin ribbons of gas. This mixture occurs but one and three-quarter inches ($1\frac{3}{4}$") ahead of the inlet valve seat.

The incoming mixture impinges first on the face of the inlet valve and then on the sides of the intake valve openings in the cylinder. The result is a homogeneous mixture.

There are many other features described in the

TRANSIT

17 x 24"

Gas Engine-Gas Compressor Catalogue

A copy will be sent you on request

REFINERY PUMPS FOR HOT OIL and every other refinery service
TRANSIT (CURTIS) ROTARY PUMPS
PIPE LINE PUMPS

BEAUMONT, TEXAS — E. L. Wilson Hardware Company
SALT LAKE CITY, UTAH — F. C. Richmond Machinery Co.

NATIONAL TRANSIT PUMP & MACHINE CO.
OIL CITY, PA.

PHOENIX, ARIZ. — Pratt-Gilbert Co.
LOS ANGELES — Republic Supply Company of California
ST. LOUIS, MO. — Reeves & Skinner Machinery Co.

NEW YORK PHILADELPHIA CLEVELAND PITTSBURGH LOS ANGELES HOUSTON TULSA NEW ORLEANS

FIELD PUMPS
TOOLS for Pipe Line Construction
GAS ENGINES
GAS ENGINE GAS COMPRESSORS

Photograph shows the Hydrauger running a bore under a busy street. Traffic goes on as usual and no pavement cutting is required.

Modern way TO INSTALL *underground* piping

Hydrauger, the modern earth-boring tool, gives greatest economy, speed, and accuracy in underground pipe and conduit installations. Pavement cutting, trenching, tunneling and backfilling are completely avoided. The Hydrauger sends its bits straight as a die toward the desired point always under target control. Rigid boring-bar properly supported as it enters the ground prevents sagging or drifting from the desired course. Easy to set up and easy to operate. Furnished in several sizes up to 10½" diameter. Write for our latest Bulletin.

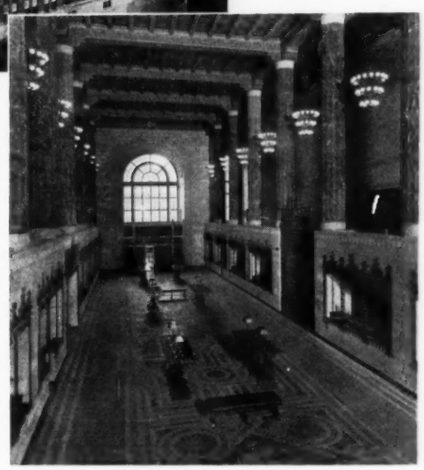
HYDRAUGER CORPORATION, LTD.

1298 Bryant Street, San Francisco
Distributors in all principal cities

HYDRAUGER

"The Mechanical Gopher"

Here's An Air Conditioning System Which Uses GAS



The banking rooms of the magnificent new Baltimore Trust Co. building shown here, are air conditioned by the Silica Gel System. The most recent installation of Silica Gel Air Conditioning is in the DALLAS GAS COMPANY building, the story and illustrations of which appear on the editorial pages of this magazine.

IN view of the present widespread and growing interest in air conditioning, executives of gas companies should investigate fully the possibilities of the Silica Gel System which uses GAS as the source of energy.

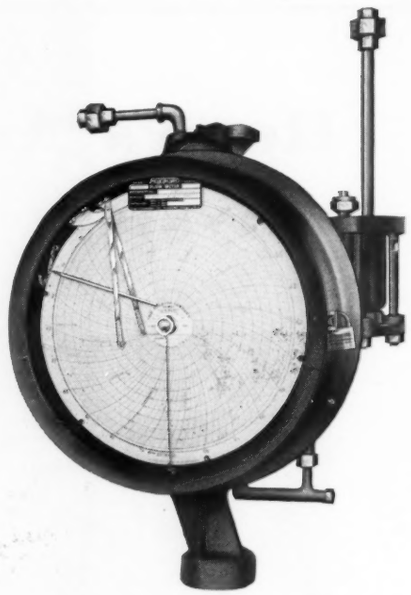
By independent and separate control of humidity and temperature, the Silica Gel System avoids the wide differentials between inside and outside temperatures and provides conditions that are healthy as well as comfortable.

Write for our book, "The Story of Silica Gel," or consult with our engineers in regard to any specific proposals in your territory.

THE SILICA GEL CORPORATION

BALTIMORE TRUST BUILDING BALTIMORE, MARYLAND

5 Cuts in Meter Maintenance Costs



THE average flow meter is in service 15 to 20 years. For this long service, only the best equipment available should be installed—equipment that will stand the gaff of the oil and gas fields and will not run up bills for excessive maintenance.

Records show that Foxboro Flow Meters have the lowest maintenance cost of any meter. And their accuracy, dependability and long life are recognized wherever flow meters are used. Five significant facts substantiate our claim of low maintenance costs.

1. **Inspection Costs Reduced.** The straight line motion of the patented segmental lever in Foxboro Meters means long periods of operating without attention. The large mercury displacement prevents dirt and sediment from disturbing the calibration. Hence fewer inspections and less time spent on inspections.
2. **Mercury Losses Eliminated.** Each meter is tested on an over-range of more than 100 times its maximum differential. Check floats are submerged in mercury and the ground seats are mercury-protected from line scale, freezing, and corrosion. The floats seat positively and not one drop of mercury is lost.
3. **Leaks and Friction Abolished.** The Pressur-Tite Bearing neither leaks nor binds, and needs no adjustment in the field. It is practically frictionless: no packing is used and the thrust of the shaft is taken on a jewel bearing.
4. **Cleaning Costs Cut.** The meter is so easy to disassemble, clean, and reassemble that it is not necessary to remove the piping or disturb the setting. The chambers have smooth, straight walls. And the 20-inch Meter is just as easy to clean as the 50- and 100-inch Meters. No recalibration is necessary.
5. **Trips to the Shop Reduced.** The uniform straight line motion gives the meter inbuilt calibration. It is never necessary to send a Foxboro Meter to the shop for calibration. The patented Segmental Lever has finally solved **that** problem. The operator has only to set the pen at zero and the meter is accurate throughout the scale.

These are all very simple achievements, but they have reduced the cost of meter maintenance from one-third to one-half in hundreds of applications. And besides, the powerful mechanism of the Foxboro Meter operates with amazing accuracy. This combination of inherent accuracy, dependableness, and low maintenance cost is your guarantee of utmost satisfaction. Write for the whole story of Foxboro Meters. A Postcard will bring it to you.

The Time To Lick Maintenance Cost Is When You PURCHASE

FOXBORO
REG. U. S. PAT. OFF.
THE COMPASS OF INDUSTRY

THE FOXBORO COMPANY
Neponset Ave., Foxboro, Mass., U.S.A.
Agents for Robinson Patented Orifice Flange Fittings
28 North Guthrie Ave., Tulsa, Okla. Magnolia Building, Dallas, Tex.
J. E. Treacy, Strada Golesti No. 9, Ploesti, Roumania
New York Chicago Boston Philadelphia Pittsburgh
Cleveland Rochester, N. Y. Atlanta Los Angeles
San Francisco Salt Lake City Portland, Ore. Detroit

Instruments for Controlling, Recording and Indicating Temperature, Flow, Humidity and Pressure

PUBLICATION OFFICE:

LOS ANGELES
124 West Fourth Street
Michigan 1481

DISTRICT OFFICES:

SAN FRANCISCO: 447 Sutter St.
Garfield 2772

NEW YORK: 110 E. 42nd St.
Ashland 4-8711

WESTERN GAS

"Reg. U. S. Pat. Off."

APPLICANT AUDIT BUREAU OF CIRCULATIONS

JAY JENKINS
Publisher

GEORGE H. FINLEY
Managing Editor

R. C. COLLING
News Editor

ELLIOTT TAYLOR
San Francisco Manager

CRAIG ESPY
Eastern Manager

W. G. RUSSELL
Mid-Continent Representative

CORRESPONDENTS IN:

Dallas, Calgary, Denver, El Paso, Vancouver, Kansas City, Little Rock, Minneapolis, New Orleans, Great Falls, Council Bluffs, Omaha, Phoenix, Portland, Tulsa, Seattle, Shreveport, Spokane, St. Louis, Salt Lake City

OFFICIAL PUBLICATION:

THE PACIFIC COAST GAS ASSOCIATION

AND

THE SOUTHERN CALIFORNIA METER ASSOCIATION

WESTERN GAS is fully protected by copyright, and nothing that appears in it may be reprinted without permission.

Contents for October, 1931

Jas. L. Stone, Newly Elected President, Pacific Coast Gas Association . . . . . Frontispiece

Convention-Exposition Launches New P.C.G.A. Year . . . 21
By George H. Finley

A.G.A. Sessions About to Convene 24

Competitive Factors and the Future of Gas Sales 25
By C. W. Gale

Bakery Oven Conversions 29
By J. F. Aicher

Encourage Terracing to Prevent Erosion 30
By D. H. Floyd

Air Conditioning by Gas 32
By L. A. Bickel

Tell the Public—Ahead of Time 34
By James H. Collins

A Chat with Your Consumers About Gas Appliances 35

Fundamentals of a Gas Heating Sales Program 36
By F. U. Naylor

Why Not Call for Quotations on Pipe Line Protection? . . . 37
By K. H. Logan

MEASUREMENT AND CONTROL 42

Remote Control Station Design at Monterey, Calif. . . . 42
By Harry J. Smith

BUTANE-PROPANE NEWS 46

The Distribution of Propane As "Bottled Gas" 46
By H. Emerson Thomas

A Year's Experience in Undiluted Butane-Propane Service to Mojave Desert Communities 48
By Lee Holtz

WESTERN GAS is published by Western Business Papers, Inc., at 124 West Fourth Street, Los Angeles. Subscription price (in advance) 20 cents the copy; $2.00 per year; 2 years $3.00; $3.00 per year foreign. Entered as second-class matter June 1, 1925, at the postoffice at Los Angeles, California, under the Act of March 3, 1879. Copyright, 1931, by Western Business Papers, Inc.

Jas. L. Stone, Vice-President and General Manager of the Spokane Gas and Fuel Company, will wield the president's gavel for the Pacific Coast Gas Association during the 1931-1932 fiscal year.

October, 1931

WESTERN GAS

"Reg. U. S. Pat. Off."

Vol. VII, No. 10

A Monthly Journal of the Gas and Gas Appliance Industries in *Western America*

Convention - Exposition Launches New P. C. G. A. Year

By GEORGE H. FINLEY
Managing Editor, Western Gas

FIRST mention in any report upon the Pacific Coast Gas Association's 38th annual meetings, which were in session at San Francisco from August 31 to September 5, should go to the Natural Gas Exposition. Staged in the huge Civic Auditorium where convention sessions were also held, the Exposition set a background and provided an atmosphere for all proceedings.

Nearly 100 booths, displaying gas appliances and accessories, and gas service equipment, were on exhibit from Monday afternoon, August 31, to Saturday, September 5. Attendance at the Exposition averaged 10,000 a day, reflecting the high public interest developed by newspaper advertising and publicity, direct mail, and the inducements of door prizes awarded each afternoon and evening. Cooking schools, fashion shows, and a continuous program of concert and special music, made a strong entertainment appeal. Exhibitors at the Exposition reported splendid results from their displays. As the accompanying view of the exhibits demonstrates, the Exposition was conducted on an impressive scale, and undoubtedly was the most spectacular popular tribute to natural gas that has been accorded on the Pacific Coast. It reflected high credit upon the Association, and upon the Pacific Gas and Electric Company which was instrumental in staging it.

Registration for the convention officially opened at 9:00 a.m. on Monday, and at its close showed the names of 459 delegates. Of these, 254 represented gas companies; 62, appliance manufacturers; 59, equipment manufacturers; 69, ladies; and 15, miscellaneous.

As the opening convention event, and official dedication for the Exposition, a luncheon was held at Larkin Hall in the Civic Auditorium, Monday noon, with P. M. Downing, vice-president and general manager of the Pacific Gas and Electric Co., presiding.

Pacific Coast Gas Association leadership for the year 1931-1932 was determined at the first general session, on Tuesday morning, held in Polk Hall at the Civic Auditorium. The nominating committee's report, offered by P. M. Downing, chairman, was unanimously adopted, bringing to office the following administration:

President: Jas. L. Stone, vice-president and general manager, Spokane Gas and Fuel Co.

Vice-President: Harry L. Masser, vice-president and executive engineer, Los Angeles Gas and Electric Corp.

Treasurer: D. G. Martin, auditor, Pacific Gas and Electric Co.

Directors (Two Year Term): F. M. Banks, Southern California Gas Co.; A. E. Holloway, San Diego Consolidated Gas and Electric Co.; W. C. Hornberger, Arizona Edison Co.; J. B. Wilson, Coast Counties Gas & Electric Co.

The following directors will continue in office next year: R. W. Miller, Pacific Lighting Corp.; J. F. Pollard, Seattle Gas Co.; E. L. Payne, Payne Furnace and Supply Co.; Geo. L. Myers, Portland Gas & Coke Co. R. E. Fisher, automatically becomes a director, as past-president.

Heading the active work of the Association's five section organizations for the coming year are the following:

Accounting Section: C. D. Cushman, Los Angeles Gas and Electric Corp., Chairman.

Commercial Section: F. M. Banks, Southern California Gas Co., Chairman.

Public Relations Section: Geo. L. Myers, Portland Gas & Coke Co., Chairman.

Publicity and Advertising Section: Walter D. Thurber, Southern Counties Gas Co., Chairman.

Technical Section: D. H. Perkins, San Diego Consolidated Gas and Electric Co., Chairman.

The 1932 convention will take its sessions to Spokane, Wash., with President Stone and the Spokane Gas & Fuel Co. as hosts.

Establishing a keynote for the convention, President Fisher in his opening address called attention to the change which has come upon the gas industry, which finds business development and public relations activities upon a full par with the technical progress for which the industry has always been noted.

A closing thought in President Fisher's address, and one which recurred throughout the convention program, was the vital need for gas company leadership in bringing together all elements of the industry in the interests of harmony and more effective promotion of gas service. Organization of company-dealer groups to advance commercial development was commended.

Following up this theme came an outstanding address on "Public Utility Merchandising," by LeRoy M. Edwards, general counsel of the Southern Counties Gas Co. Mr. Edwards dealt with the anti-utility merchandising movement, its causes, and the necessity for meeting the issue decisively. He summoned legal precedent and eco-

nomic fact to demonstrate the unquestioned justice of the utility stand for merchandising, and detailed the benefits which result to public, dealer interests, and utilities from utility merchandising effort.

H. R. Halsey of J. David Houser and Associates, New York City, brought an interesting message to the first general session of the convention in his remarks on "The Greatest Asset of a Public Utility." With particular reference to the course in public relations, prepared for utility employees by his organization, through the American Gas Association, Dr. Halsey pointed to the value of an informed employee body to a company.

At the opening general session the Association conferred honorary membership upon Dan J. Young of Tacoma, Wash., following a motion submitted by C. B. Babcock.

Something different in general session programs was offered the convention Wednesday afternoon as a contribution from the Publicity and Advertising Section. This Association unit was newly organized last year, with Walter D. Thurber, Southern Counties Gas Co., as chairman. Several speakers brought executive viewpoints to bear upon advertising problems. The first address was that of Vincent Ely, representing the California Newspaper Publishers' Association, whose topic was "Why Advertise in Newspapers." Harry F. Anderson of The National Broadcasting Company, Inc., gave an exposition of radio advertising. Three reports followed, on "Advertising Policies, Practices and Costs," by F. M. Banks of the Southern California Gas Company; "Evaluation of Advertising," by H. L. Masser, of the Los Angeles Gas and Electric Corp.; and "Institutional Advertising," by Jas. F. Pollard, Seattle Gas Co. D. L. Scott, Los Angeles Gas and Electric Corporation, concluded the sessions with his address entitled, "And They Do Say!"

Introducing the third general session of the convention, Thursday morning, greetings from the American Gas Association were brought by A. B. Macbeth, past-president of the A.G.A. and president of the Southern California Gas Co. Mr. Macbeth spoke particularly of the basic five-year program developed by the A.G.A., of the establishment of the branch laboratory on the Pacific Coast, of the A.G.A.'s recent formulation of fundamental principles to guide in gas company merchandising, and of the several courses in salesmanship, employee-customer relations, etc., prepared by the American Gas Association—as typical of the national organization's service to the industry.

The Natural Gas Exposition—spectacular appeal to Northern California gas users—

"The Woman's Place in the Public Utility Industry" was the theme of a public speaking contest held at the Thursday morning general session under the auspices of the Women's Committee, Public Relations Section. Miss Cleo McGuire, of the Southern Counties Gas Co.'s Santa Monica office, won first place and $50 prize money. Second place went to Mrs. Beulah Brown of the Pacific Gas and Electric Co., with $25 prize. The speakers represented member companies which had conducted intra-company elimination contests.

Following the speaking contest, Miss Jessie McQueen, home service counsellor for the American Gas Association, brought a message on "Home Service—Its Activities and Results." Other Thursday morning addresses were those on "Taxation of Public Utilities," by A. A. Smith, secretary and general attorney for the Eastern Oregon Light and Power Co.; and the report of the cooperative advertising committee, by J. Chas. Jordan, Pacific Gas and Electric Co., chairman. Mr. Jordan reviewed the Association's cooperative campaign, to which participating companies are allotting $55,000 in the current year.

A program arranged by the Public Relations Section was offered at the Thursday afternoon general session. The public speaking contest for men, on the subject of "Government Ownership of Public Utilities," led this program, speakers from six member companies taking part in the event. Clyde H. Potter of the Southern Counties Gas Co. was in charge of this activity, which included elimination contests in the several companies. L. D. Connard of the Pacific Gas and Electric Co.'s Sacramento Division was the successful speaker, winning the $50 first prize. Second place and $25 prize money was won by Frank A. Easton, San Joaquin Light and Power Corp.

On Friday morning at the final convention session playlets submitted in the Public Relations Stunts contest in competition for the Addison B. Day Trophy were staged. "I Am The Company" was the theme, and A. C. Joy of the Pacific Gas and Electric Company presided over this section of the program. Two playlets were presented, the winning skit being that of the Los Angeles Gas and Electric Corp., written by George M. Sadler and played by Jessie Main, William Evans and Mr. Sadler. Another interesting playlet presented under the title "We Give Service" was put on by the Pacific Gas and Electric Co., staged by Lillian McGrath, Eleanor Gemmel, H. Wilson, Jack Coakley, D. J. Bartelme, J. Stephens, W. Parks.

Each of the Association's five sections had special convention activities of value to its members. The Accounting Section, of which R. A. Hornby of the Pacific Lighting Corp. served as chairman, held two sessions, in addition to arranging a valuable machine billing exhibit which was available for inspection during the convention, with operators demonstrating use of the equipment.

The single session held by the Commercial Section, Wednesday morning,

supplied the background for P.C.G.A. sessions in San Francisco's Civic Auditorium.

included some significant material for merchandising men. H. M. Crawford, chairman of the Section, introduced F. M. Banks, Southern California Gas Company, who as chairman of the Domestic Sales Committee, presided over the morning's program. Outstanding on the program was the paper on "Competitive Factors Affecting Gas Sales," given by C. W. Gale, Public Service Co. of Colorado. Mr. Gale's paper appears in full in this issue.

Under the work of the Public Relations Section, of which Geo. L. Myers, Portland Gas and Coke Co. was chairman, came a variety of activities last year. Public speaking and essay contests covered elsewhere in this review were conducted by this Section.

A particularly active group was the Women's Committee, with Clarita Scott, Los Angeles Gas and Electric Corp., as chairman. Among other enterprises, the Women's Committee conducted a contest in which exhibits were submitted by 10 committees, reflecting their year's work. This "Committee Achievement Contest" was won by Mrs. Marvel Murray and her committee of Los Angeles Gas and Electric Corp. P. M. Downing, vice-president and general manager of Pacific Gas and Electric Co., was the donor of prizes in this competition.

Another Women's Committee activity was a playlet contest participated in by several of the Women's Committee groups. Addison B. Day, president of the Los Angeles Gas and Electric Corp., offered cash awards for the winning playlets, and Miss Isobel Allobach, of the Southern Counties Gas Co. Women's Committee, was responsible for the winning playlet, which was presented at the Tuesday afternoon session of the Public Relations Section. The title of Miss Allobach's playlet was "Gone Modern," and it was produced by F. S. Curren and Peggy O'Mahony, both of the P. G. and E.

Miss Scott presided over the Public Relations Section's Tuesday afternoon meeting, the program of which was keyed to the interests of "The Female of the Species."

The Technical Section, under the chairmanship of W. M. Henderson of the Los Angeles Gas and Electric Corp., reviewed a splendid year of committee work in its two sessions. Brief presentations of the reports published in *Western Gas* for August introduced general discussion of the report subjects. In addition to the published papers further contributions to the program were submitted, on "Effect of Sulphur Dioxide in Stack Gases" by M. T. Burton of the Southern California Gas Co., and "Large Volume Measurements" by A. R. Bailey of the Coast Counties Gas and Electric Co. A feature of the Technical Section program which promised much interest was a symposium held at the conclusion of the Wednesday morning meeting. Lack of time made it impossible to present many of the scheduled subjects, but an interesting discussion on "Testing the Atmospheres of Underground Street Vaults" was given by Norman L. Hoff of the Los Angeles Gas and Electric Corporation. A review of the research work being conducted at the University of California was also offered to the technical men by Hugh H. Hyde, Pacific Coast Gas Association Research Fellow in Gas Engineering.

Convention entertainment as usual offered a varied round of activity, principal events centering on Friday when the boat ride on San Francisco Bay was conducted, and the annual men's golf tournament was held.

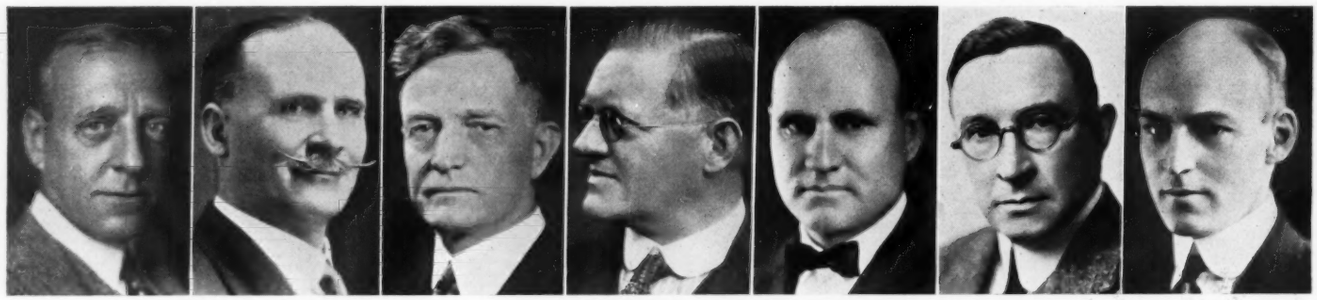
The 38th Annual Banquet, at the Palace Hotel on Friday evening, was attended by nearly 500, bringing the convention to its close. At the banquet President R. E. Fisher formally inaugurated the new panel of officers, introducing James L. Stone, incoming president and conferring upon him the Association's badge of office.

Convention awards were announced by R. S. Fuller, Pacific Gas and Electric Co., chairman of the Awards Committee. The Basford Trophy for outstanding Section activity went to the Public Relations Section, of which Geo. L. Myers was chairman, and the individual committee award went to the Women's Committee of the same Section, headed by Miss Clarita Scott.

A new award, to be made for the first time at next year's annual convention, was announced at the annual banquet. Addison B. Day has placed an annual medal at the disposal of the Association, to be awarded to the individual judged to have made the most outstanding contribution to the industry's advancement. The Association's president, vice-president, and three members appointed by the president will act as judges.

Convention golf winners were given their laurels at the annual banquet. The much-coveted Babcock-Peterson-Basford Cup awarded for low gross will be held for the coming year by W. H. Mixter of the H. R. Basford Co. Winners of low net prizes in the four flights of the men's tournament were W. H. Mixter, Harry A. Leed and E. C. Johnson. Second low net in the various flights went to Joseph E. Moore, P. M. Downing, A. E. DeBurn and John Coakley. F. H. Bivens and A. C. Hacker tied for the blind bogey prize, and Jack Heil won the Mystery Hole prize.

Staging an annual convention is always a task calling for efficient management and contribution of much volunteer effort by convention committees. This year, with the Natural Gas Exposition added to convention proceedings, the job was a monumental one, handled with much credit to those in charge.



Oscar H. Fogg J. Herbert Canning H. O. Caster Sir F. Goodenough Dr. Zay Jeffries B. C. Forbes Geo. E. Whitwell

A few convention personalities on the general session speaking program at Atlantic City

A. G. A. About *to* Convene

5-Year Program, Air-Conditioning, Headline Topics

FOR the third consecutive year the American Gas Association is summoning its members to Atlantic City, where the facilities of the Atlantic City Auditorium will form an ideal background for the 13th annual convention and exhibition. Convention dates are October 12-16.

A bigger exhibition, excellent sectional programs, and general sessions which bring many of the industry's leaders to the convention platform, combine to make the 13th annual meetings worthy of the industry's progress during the past year.

Detailed consideration will be given to the new Five-Year Program of Association Activities which received approval of the Executive Board last May, several program features treating phases of the recommended scope of future A.G.A. work.

While each of the sections has planned a full program of specialized interest to its members, some of the topics are of outstanding importance at this time. The subject of gas use in house-cooling and summer air conditioning, to be covered by the committee on industrial gas research, will command unusual attention, in view of the interest centering on this potential off-season load.

On the general session speaking program are a number of business and industrial authorities, as well as many gas executives with pertinent messages for convention consideration. Among the general session features are the following:

The Laboratory's Program: George E. Whitwell, The Philadelphia Electric Co., Philadelphia, Pa.

Economics of Selling Gas: Sir Francis Goodenough, C.B.E. Executive Chairman, British Commercial Gas Association, London, England.

Report of Committee on Accident Prevention: C. C. Atwood, The Brooklyn Union Gas Co., Brooklyn, N. Y., Chairman.

Report of Committee on Education of Gas Company Employees: A. J. Sarre, New Orleans Public Service Inc., New Orleans, La., chairman.

Report of Committee on Rate Structure: F. A. Newton, The Commonwealth & Southern Corp., New York, N. Y., chairman.

Report of Committee on Rate Fundamentals: F. L. Daily, Chicago, Ill., chairman.

The Association's Program: D. D. Barnum, president, Boston Consolidated Gas Co., Boston, Mass.

Gas is the Logical Fuel: Morse Dell Plain, president, Northern Indiana Public Service Co., Hammond, Ind.

Problems of Dealer Relationship: Oscar H. Fogg, vice-president, Consolidated Gas Co., of New York, New York, N. Y.

Industry's Advance Through Research: Dr. Zay Jeffries, director of research, Aluminum Corp., of America, Cleveland, Ohio.

Developments in the Natural Gas Field: Judge H. O. Caster, general counsel, Henry L. Doherty & Co., New York, N. Y.

What is Ahead: B. C. Forbes, editor Forbes Magazine, New York, N. Y.

Monday, October 12, will be given over to the opening of the Exhibition, meetings of the various Sections and of the executive board and the managing committee of the Natural Gas Department.

On Tuesday, the first general session will convene at 10 A.M. with a call to order and opening remarks by Clifford E. Paige, president of the Association, following which greetings will be extended from American and Foreign Associations by Kurwin R. Boyes, secretary of the A.G.A.

An international note will be struck with the presentation of J. Herbert Canning, O.B.E., president of the British Institution of Gas Engineers, by President Paige. Sir Francis Goodenough, C.B.E. Executive Chairman of the British Commercial Gas Association of London, England, is another scheduled speaker in Wednesday's general session.

The Annual Address of the President by Clifford E. Paige, vice-president of the Brooklyn Union Gas Co., Brooklyn, N. Y., will have for its subject the interpretation of the Five Year Plan.

A.G.A. organization reports will find a place in this first general session, with Alexander Forward, Managing Director, reviewing the year's activities. Wm. J. Welsh, treasurer, will give the financial history of the Association for the past year, and H. C. Morris, president of the Dallas Gas Co., Dallas, Texas, will read the report of the general nominating committee. Following this report the election of officers will be held.

Executive sessions open only to com-

(Continued on Page 60)

Competitive Factors and the Future *of* Gas Sales

By C. W. GALE

Superintendent Commercial and Industrial Gas Divisions—Public Service Company of Colorado—Denver, Colorado.

MR. GALE has done a thorough job of analyzing competitive trends, in this discussion presented to the convention of the Pacific Coast Gas Association. Along with the factors which favor gas sales development he calls attention to certain unpalatable facts which gas sales managements cannot afford to ignore. Competition is tightening; rival fuels are better organized, and have followed the gas industry's example in bettering utilization equipment and practice. Now is no time for sales departments to coast, for the momentum acquired by splendid accomplishments of the past few years is meeting sterner resistance. Gas men must bring superior salesmanship to bear on every sales frontier.—Editor.

C. W. Gale

RAPIDLY changing economic relations between competitive fuels require careful study by those responsible for the development and preservation of the domestic, commercial, and industrial gas load. Never before has competition from all sources been more severe or so foreboding, particularly to the commercial and industrial gas business. The legions of competition are marshalling every force to press the advantages of deflated prices and political influence to the end that fuel markets gained for gas be restored to those who previously enjoyed it. The advent of natural gas, introduced to thousands of cities, towns and communities of the Pacific Coast, Rocky Mountain States and Mid-continent area, has been embarrassing, to say the least, to coal, oil and wood interests. Natural gas rates designed to secure the business of 1929 may prove inadequate to hold the gas load of 1932 against the forces of competition. The task of securing additional commercial-industrial business becomes problematical. Coal, oil and wood interests have taken painful losses in sales volume during the past few years at the hands of natural gas.

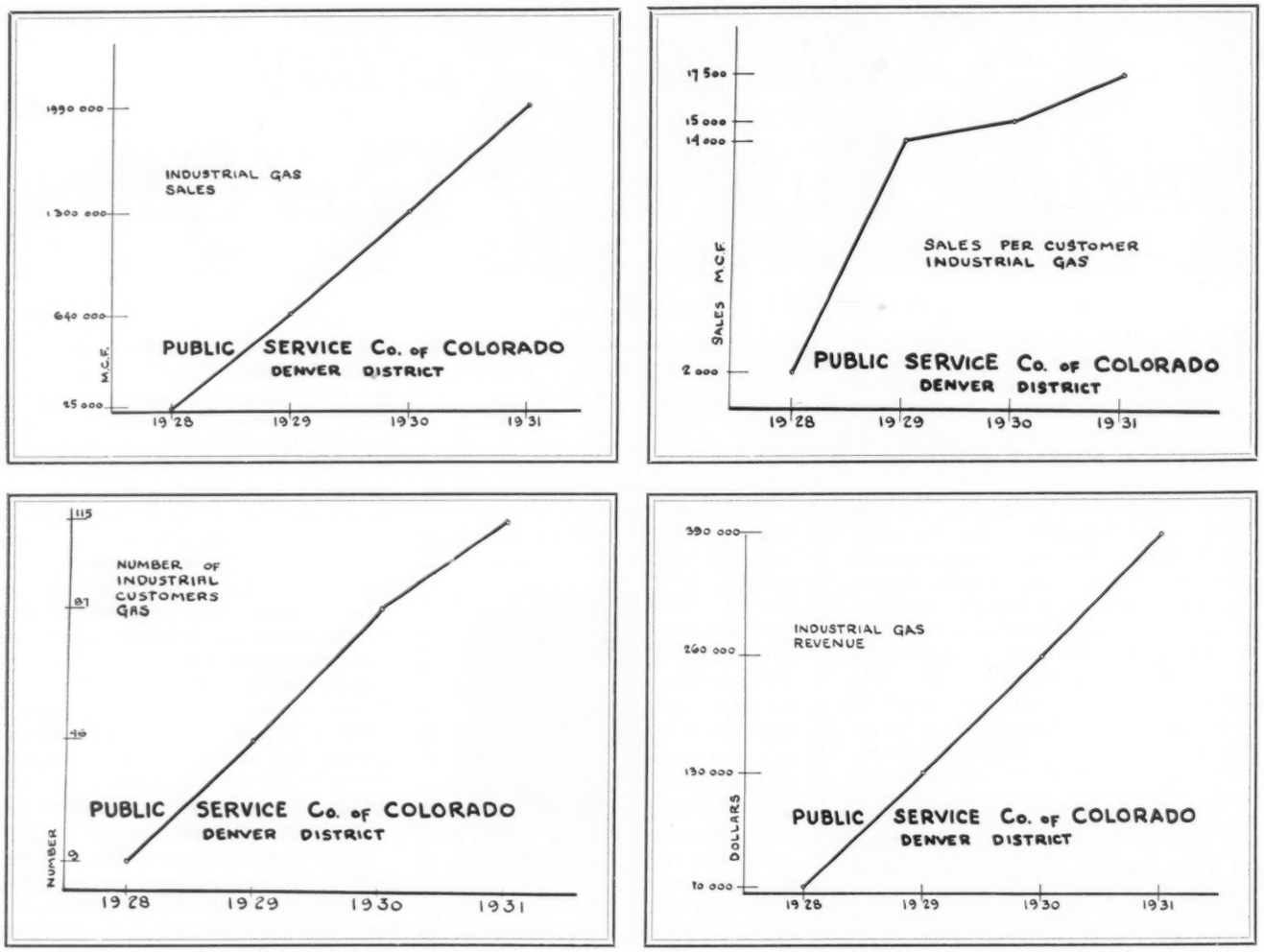
I doubt if you have on your lines many users of industrial natural gas where gas is actually cheaper than the prevailing competitive fuel on a cost per million B.t.u. basis of the bare fuel. Gas customers were gained by your sales engineers' special knowledge of the proper utilization of fuel and the capitalizing of all items incident to the use of other and less desirable fuels. Your sales engineers have, in a majority of cases, made improvements in customers' plants and equipment peculiar to the plant only, not directly attributed to the use of gas and applicable to any fuel. These improvements have accrued to and have been credited to the use of gas as a fuel. Your sales engineers have skillfully combined their engineering findings in these plants with a sales appeal bordering on the esthetic on which no monetary value could be placed. This would include such items as civic pride, absence of smoke nuisance, convenience and the like. There is no doubt that on a wave of popularity combined with advertising and aggressive sales solicitation gas has, in many instances, been sold beyond the true economics of the situation.

Competition Tightening

Your competitors lost ground readily to gas, largely through failure to entrench themselves in the science of correct utilization of fuel, failure to develop customers' appliances suitable for that fuel and failure to engage in sales promotional programs to extend the use of their product and fortify its use in existing markets. This lethargy on their part permitted consumers to establish and continue all the unscientific practices common to utilization of coal and oil as fuel. All gas sales programs have thrived upon the vulnerability of their competitors in this situation. Coal and oil interests, particularly in the past few years, have taken costly lessons from utility companies in the matter of production, distribution and utilization of fuel, as well as in sales promotional methods. Advantage will be taken, as far as possible, of the present distress prices of oil and in some sections of the country of lower mine wages on coal, to regain old customers and check the advance of natural gas. Once these markets are lost to gas they will be regained primarily on the basis of B.t.u. cost, the disparity between utilization efficiencies of gas and other fuels being partially removed in the interim. Butane and propane gas may prove a competitive factor to the natural gas business, although in many respects these gases are being used as sales allies.

Developments in coal stokers, both industrial and for household use, are going ahead apace. Powdered coal practice in large industrial plants has reached high degrees of efficiency. Improvements in mechanical atomization of oil and advanced furnace design will restore oil to better favor than before. High combustion efficiency and controllability of natural gas are partially offset by the non-preventable losses after combustion which establish very definite limits for improvements in gas utilization efficiency. The whole field of research and invention tends to bring the utilization of all fuels more nearly to their ultimate or maximum efficiency. Deleterious action of various fuels on furnace walls becomes more uniform with advanced refractories and with air and water-cooled combustion chamber walls. These factors all tend to bring fuel computations closer to the straight B.t.u. comparison.

Completely automatic coal handling and ash disposal systems are high in first cost and expensive in maintenance, and available to large plants only. Pulverized coal units are considered feasible only in the largest of plants and also have the disadvantage of high investment and maintenance. Gas has several advantages when used to displace such equipment and fuel. Small stoker installations for commercial and domestic use are not truly automatic



A Graphic Record of Gas Sales Development Results Following the Introduction

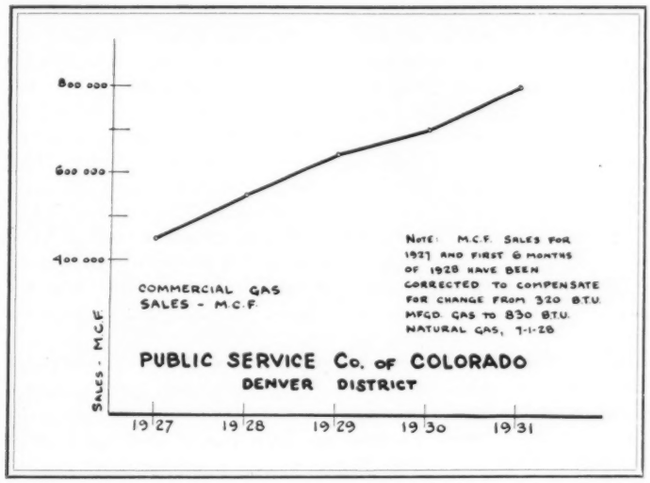
since the fuel must be shoveled into the hopper, clinkers removed from the grates and ashes carried from the building. Such installations have nearly all the disadvantages of hand-firing plus higher investment and maintenance. In many recorded cases fuel consumption has been greater with stokers than with hand firing due to predominance of excess air with blast firing. The advent of stokers in our district has raised the price of slack coal from $2.50 to $3.65 per ton in small plants. The small stoker will find it more difficult to compete with natural gas.

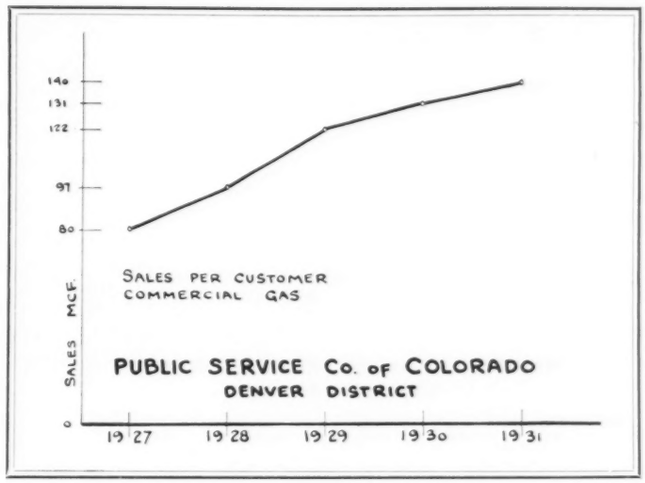
Transportation of gas to the point of use still has great advantages over distribution and handling of coal. Part of this advantage may be offset by impending legislation and taxation of commodities conveyed through pipe lines either interstate or intrastate. In some states measures are proposed for taxing gas transmitted by pipe line companies and additional taxation is proposed on the same gas when purchased and sold by distribution companies. Regardless of the motives that prompt such excise measures the issue must be faced and met squarely by the gas utility companies. Natural gas and oil pipelines have caused serious loss of revenue to railroad and steamship transportation companies and they will seek measures to protect their investments and stabilize their earnings.

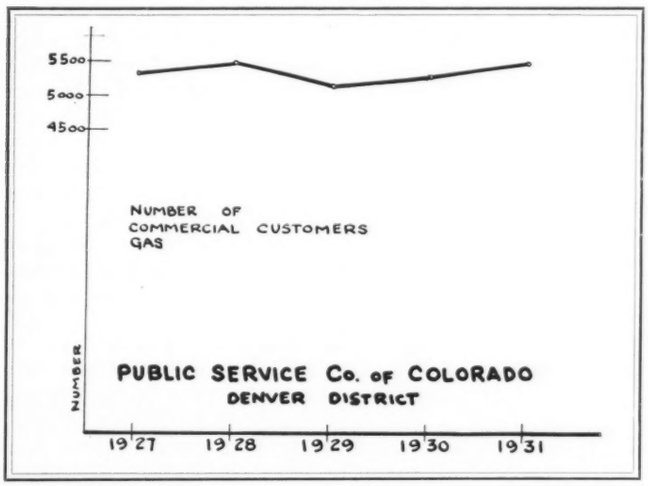
Separate and apart from the above economic struggle, competition for the customers' dollar is waged relentlessly on a different frontier. The plant management may choose to invest an available surplus in labor-saving machinery or plant rehabilitation instead of change to gas fuel. The return may be more attractive and more immediate along other avenues of improvement and change. Too often the change to gas does not offer sufficient savings to amortize the required expenditure for gas equipment within a reasonable time. In the field of domestic gas sales, competition for the customer's dollar may be a radio, new car, vacation or fur coat. Your success in this direction rests entirely with your selling organization and its ability to create desire and sell the benefits of gas service. Customer acceptance of gas for domestic purposes does not depend on basic economics to the same extent as does the commercial and industrial load. This is borne out by the encroachment of the electric range in natural gas territory where the cost of gas service is much less than electric service.

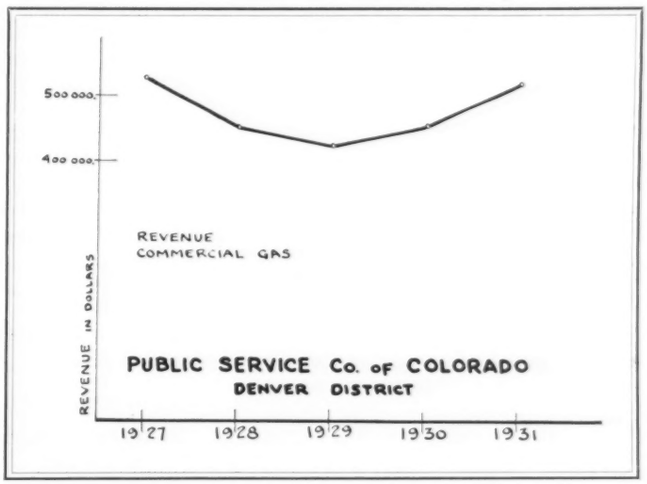
Combination Company Problem

Combination gas and electric companies have complex problems peculiar to their own organization and business structure. Natural gas internal combustion engines attack the electric power load of such companies. Such companies are in competition with themselves with both gas and electric ranges, water heaters and bake ovens. Natural gas for boiler fuel definitely precludes the possibility of many isolated plants being shut down in favor of purchased central station power. If the operating ratio favors the electric load instead of


800 000
600 000
400 000
COMMERCIAL GAS
SALES - M.C.F.
NOTE: M.C.F. SALES FOR 1927 AND FIRST 6 MONTHS OF 1928 HAVE BEEN CORRECTED TO COMPENSATE FOR CHANGE FROM 320 B.T.U. MFGD. GAS TO 830 B.T.U. NATURAL GAS, 7-1-28
SALES - M.C.F.
PUBLIC SERVICE Co. of COLORADO
DENVER DISTRICT
19 27
19 28
19 29
19 30
19 31







of Natural Gas in the Public Service Company of Colorado's Denver District

the gas load the management of such companies is prone to place restrictions upon the activities of the gas sales divisions to protect the company's over-all situation. Executives of combination companies frequently rule against gas in close situations where gas might have been employed advantageously and where the entire gas program might have been advanced. If gas is to be sold only in spots most advantageous to the company the whole gas program is retarded through the restricted policy. Management, of necessity, must expect budgets and accomplishments commensurate with policies. Some combination companies sell electricity, gas, coke, tar, central station steam-heat and market their own securities. The competitive problems arising within such companies are indeed complex and difficult of solution.

Whether your company be combination gas and electric, or operating along a single line of endeavor, your commercial and industrial gas sales departments are confronted with the competition set up between domestic and commercial users of gas. The industrial sales department attempts to sell gas fuel to a laundry and is reminded by the management of the laundry that the company has hurt his business immeasurably by promoting gas and electric washers and ironers in the home. He is, therefore, not kindly disposed toward utility service at his laundry. The same is true of both wholesale and retail bakeries whose managements deplore the home baking demonstrators, the heat-regulated domestic ovens and the activity behind such domestic appliances. Gas and electric refrigerators have diminished the most profitable part of the ice plant business, the retail sale of domestic ice. The plant management is not likely to turn its fuel requirements over to gas without a few preliminary considerations.

One factor which seriously discredits the use of gas for industrial purposes is the lack of acceptance of gas fuel in the utility company's own boiler plants. Many gas company engineers and operators are from the old school of coal and oil, and budge not an inch in the matter of using gas in their own steam plants. The first question asked of your industrial sales department is, "Why does your company not use gas for fuel in its boiler plant?" The customer's theory is that "What's sauce for the goose is sauce for the gander." I believe that to be successful and sincere we should take our own medicine in large spoonfuls. The best argument in favor of gas in large boiler plants is to point to gas installations in your own plants. If the economies do not favor its adoption in your own plant then your industrial gas sales program is builded upon an unsound foundation. Your larger prospects and customers may, at any time through plant rehabilitation, consolidation or strategic location, place themselves in an economic position as desirable as your own.

Obligation to Merchandise

Companies that sell gas appliances and equipment are encountering very

disheartening competition from merchants and tradesmen in their territory. Whether you merchandise or for policy reasons have discontinued merchandising the fact remains that the gas and electric utilities of this country have pioneered the development and introduction of every appliance now having customer acceptance. If any one has an inherent obligation to merchandise gas and electric appliances it is the gas and electric utility companies. It has been demonstrated over a long period of years that our customers require and demand our specialized knowledge of the appliance business. It is our responsibility to establish the standard of gas appliances connected to our own lines, to introduce new and beneficial agencies for the use of gas, to maintain standards of service acceptable to the customer and to increase the use of gas constantly to the end that the cost of gas service may be lowered. I believe gas companies can best maintain a balance of all these objectives through merchandising. Utility companies have created a huge field for merchandising and have made possible, through their selling organizations, large enterprises devoted to production of appliances. Plumbing, steam-fitting, wiring and tinning sub-contractors throughout the nation have profited by the vast amount of business turned over to them as a part of the utility promotional program. Progressive merchants have profited through their ability to participate in merchandising activities pioneered and cultivated by the utility companies. Jobbing houses, tradesmen and the public at large have benefited.

The policies set forth by the American Gas Association governing merchandising should be strictly adhered to in order that every merchant and tradesman can engage fairly in the gas appliance business. The customer will look to the gas company for appliance advice and counsel and probably insist that the gas company be responsible for the sale.

Commercial and industrial sales departments must be students of economic trends and clearly define those objectives which are possible of attainment. Some obstacles cannot be overcome under your present set-up. Such obstacles must be presented to the management with recommendations for surmounting them. The predominance of operators, engineers, and accountants in sales executive positions complicates the problem of the selling organization through the lack of appreciation of sales problems and dearth of sympathy for sales promotional work. The whole gas utility business seems founded upon engineering and accounting. The fundamentals of gas production, transmission and distribution are now well defined scientific laws. I doubt if any discovery or improvement in this field in the next few years will change, by an appreciable per cent, the economic position of gas with respect to competitive fuels. I doubt if any change or improvement in accounting methods will, in the next few years, change the economic position of gas with respect to competitive fuels. The vast field of advance and improvement is in that of sales and selling procedure. Gas men must begin to realize that every time a new gas customer is secured, some other competitive agency loses an equivalent amount of fuel business—either coal, coke, oil or wood. These agencies cannot afford to sit back and see their business swept away from them. They are already amalgamating themselves into national associations to combat our selling efforts, much the same as we are met here to develop plans for the extension of our own gas business. We will have to excel in knowledge of the business and presentation of our proposals; capitalize to the fullest extent the place and form value of gas as a fuel, together with all its tangible and intangible worth; liberalize our merchandising policies; perfect our rate structures, and meet completely the economics of competitive fuel costs. Failure to meet competition will doubtless prove costly in revenue losses.

Denver's Record

The extent to which the Public Service Company of Colorado, Denver sales organization, has been able to surmount such competitive factors is borne out by the following brief statistics. Natural gas was introduced to Denver and environs during July, 1928. Prior to this time manufactured gas of 320 B.t.u. calorific value was supplied. The new natural gas has a calorific value of 830 B.t.u. per cubic foot under barometric conditions existing at the point of utilization. Due to the higher heating value of the new gas a corresponding decrease in M.c.f. consumption per customer was anticipated. The ratio of heating value between the two gases was approximately 2.6 to 1, an estimating basis of 2.5 to 1 being arbitrarily used. The change-over to natural gas was effected in the mid-summer of 1928 when our load was not influenced by space heating trends. When full monthly comparisons of the two gases were available it was found that natural gas occasioned a usage of less than 40 per cent of the original manufactured gas volume, bearing out our B.t.u. comparisons and anticipated ratio. Since the average rate charged for manufactured gas was 72.9c per M.c.f., and the average rate for the higher heating value natural gas was 78.0c per M.c.f., a serious reduction in gross and net revenue was at once apparent. The task of the sales department became that of regaining lost revenue as promptly as possible to restore the gross and net earnings situation of the company. The total revenue loss due to change to natural gas amounted to 57 per cent of the manufactured gas revenue. Due to a highly specialized trained selling organization all of this lost revenue was regained in the first full year of natural gas.

At the present writing, after three full years of sales promotional activity, the consumption per customer-month in Denver has been increased from 1,280,000 B.t.u. under manufactured gas to 5,278,800 B.t.u. under natural gas, or more than four times the usage of heat. There are approximately 50,700 individual dwelling houses in Denver, exclusive of apartment houses. Of this number 10,302 are now using gas as the exclusive fuel for house heating. Sales department records show 8,797 of this number, while dealers and tradesmen account for 1,505 installations.

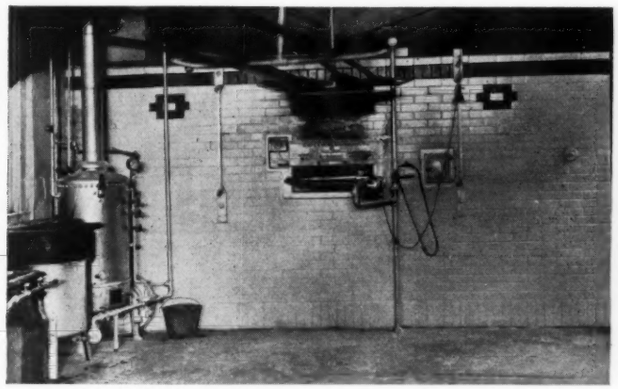
Removals of house heating from all causes, even under depressed conditions, total only 502 in the three years since the commencement of Denver's natural gas sales program. Cheap coal is abundant on the outskirts of the city, natural gas costing from 20 to 100 per cent more than coal for residential heating purposes. Our representatives may especially be commended for clean, truthful selling and for practical working knowledge of their specialized activities.

The gas sales organization is divided into four major endeavors, domestic, househeating, commercial and industrial.

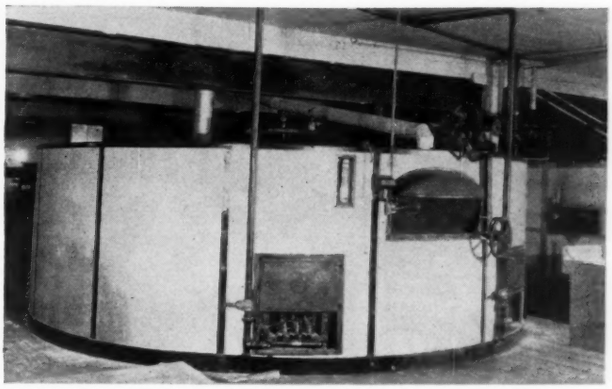
The growth of Denver's commercial and industrial M.c.f. sales per customer is best shown in the accompanying graphs. Figures for 1927 and the first half of 1928 have been corrected to compensate for the lower heating value of manufactured gas prior to introduction of natural gas in July, 1928. It is seen that commercial sales per customer had increased 65 per cent in 1930 over 1927, while 1931 is expected to show an increase of 6 per cent over 1930. Industrial gas contracts on a shut-off basis were not offered until the Fall of 1928. Since this is a new classification of business its growth is best shown by the accompanying graphs.

These increases have been made notwithstanding general conditions affecting this classification of customers. The average rate for industrial gas in Denver is 20c per M.c.f. (830 B.t.u.) Commercial gas revenue, which experienced reductions due to the new gas,

(Continued on Page 60)



Installation of N. G. E. Type G oven burner in bakery at Tracy, Calif. The 4-H.P. gas boiler is used for steaming the oven.



Several ovens of the rotary type shown above have been cut over to natural gas on the Pacific Gas and Electric Co. system.

Bakery Oven Conversions

By J. F. AICHER

Industrial Engineer
Pacific Gas and Electric Company

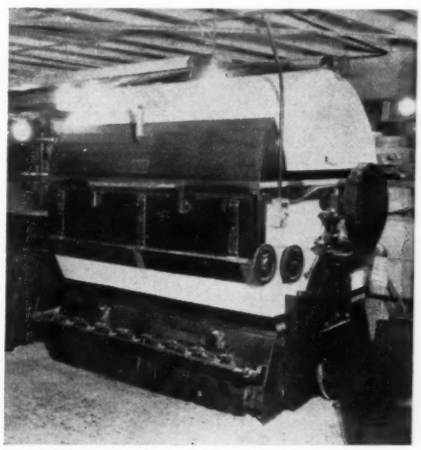
THE bakery business in northern California has always been a good fuel customer. The fuel requirements of bakeries vary with their size, the average neighborhood bakery requiring about 35,000 cu. ft. of natural gas per month. This usage is divided between a Dutch oven, a doughnut kettle, a water heater and possibly a small steam boiler. When using manufactured gas the average bill of the corner bakery was approximately $40 per month. With the perfection of reasonably priced oil-burning equipment this fuel bill, using oil for the oven and gas for the remainder of the requirements, amounted to from $20 to $25 per month. With this differential in monthly cost a large portion of the business was taken on by the oil companies. However, the advent of natural gas has changed these conditions so that oil and gas are now competitors on practically an equal basis. The rates for which natural gas is sold to bakeries, and the development of efficient gas burners has resulted in the conversion of 107 of these ovens to natural gas fuel since its advent.

J. F. Aicher

Bakeries located in San Francisco and the East Bay territory enjoy the following rate for natural gas:

Service Charge: Per meter per month.....60c
Commodity Charge:
First 5,000 cu. ft. per meter per month.....8.5c per 100 cu. ft.
Next 25,000 cu. ft. per meter per month.....7.5c per 100 cu. ft.
Next 170,000 cu. ft. per meter per month.....6.0c per 100 cu. ft.
All over 200,000 cu. ft. per meter per month.....5.0c per 100 cu. ft.

A survey of the bakeries in this territory as of June 1, 1931, shows that there are still approximately 388 ovens being fired with oil. This means that approximately 21 per cent of all the bakeries which were using competitive fuels at the time natural gas was brought into northern California, have been converted.



Revolving oven for pie baking, installed in a San Francisco bakery.

The bakery fuel business is very desirable from several standpoints:

The load is constant practically all year round and the demand occurs usually during off-peak hours. The average revenue from one bakery is approximately $300 per year. The amount of service required is very small.

The accompanying photographs show some of the installations which have been converted to natural gas in Northern California. Some additional installations are as follows:

The Government Bakery, Presidio of San Francisco, 3 indirect-fired ovens.

Victoria Pastry Co., San Francisco, 3 ovens.

Hellwig's Bakery, San Francisco, 2 direct-fired ovens.

Crispi Pie Co., San Francisco, 2 ovens.

The Golden Pheasant, San Francisco, 2 direct-fired ovens.

Ycre French Bakery, San Francisco, 3 ovens.

New Parisian Bakery, San Jose, 2 indirect-fired ovens.

The Purity Baking Company, San Jose, 3 indirect-fired ovens.

Palace Hotel, San Francisco, 3 indirect-fired ovens.

Gravem and Inglis Baking Co., Stockton, 2 indirect-fired ovens.

Fosters Lunch System, 3 indirect-fired ovens.

Larraburu Bros. New Parisian Bakery, San Francisco, 4 direct-fired ovens.

Sanitary Bakery, Berkeley, 2 direct-fired ovens.

Gene Compton's Restaurant, Oakland, 1 direct-fired oven.

Del Monte Hotel, Del Monte, indirect-fired ovens.

San Anselmo Bakery, Marin County, 2 direct-fired ovens.

(Continued on Page 66)

Fig. 1. A gulley wash that has formed in the last 5 years. Proper terracing would have prevented the damage.

Fig. 2. Soil washing along a pipe line—expensive both to land owner and pipe line company. Adequate drainage and terracing would have forestalled this wash.

Encourage *and* Lower

▼

ATTENTION of the pipe line operator is here called to a exing maintenance problem—and a suggested solution. While soil erosion has long been recognized as a peril to farm lands, it should also cause the pipe line company deep concern. In territory traversed by pipe line systems of the Southwest Gas Utilities Corp. in Oklahoma, interest has been centered recently upon terracing to prevent soil erosion, and pipe line companies have put their shoulder to the wheel along with farm interests. According to C. A. Breitung, consulting engineer and Oklahoma manager for the Southwest Gas Utilities Corp., terracing has offered an adequate solution to the problem where it has been applied in this area. Says Mr. Breitung, it not only lowers pipe line maintenance costs, but also affords an opportunity for constructive cooperation with landholders along the right-of-way.

Mr. Floyd in this article gives the reader some of the background of the soil erosion problem, and sets forth fundamentals of terracing procedure.—*Editor.*

SOIL erosion, or the washing away of earth by water, is estimated to cost the farmers of the United States $200,000,000 every year, not taking into consideration the loss to companies owning pipe lines that run over the same area.

Approximate loss to companies owning pipe lines has not been estimated as yet, but there is no doubt that it is considerable, and that it could be cut down to the minimum by terracing.

In the Seminole area, one of the greatest oil fields known, the practice has saved companies thousands of dollars due to their efforts during the past 18 months. One of the biggest boosts given to terracing in Oklahoma during the past year has been the terracing contest in Seminole County, which was completed the last of April, in which a total of $1,000 in prizes was offered by Dr. W. E. Grisso of Seminole, Oklahoma.

This contest, conducted by C. S. Sullivan, County Agent, put the practice forward by leaps and bounds in this section. Terracing on the farms which entered the contest is only a small amount of the terracing done as a result of the interest aroused. The way in which all agencies were used in the county for promoting this work and for the actual laying out of the terraces gives a most excellent example of coordination of all available forces.

At the time the contest started, pipe line companies were not in the least interested, but today, after seeing the value received, they are studying this soil erosion in earnest so that they may be able to help keep such good work going.

This contest has resulted in an estimated 8,000 acres of terraced land in the county, against 2,000 acres terraced in the year 1930.

From the standpoint of savings to pipe line companies, they should be one of the leaders in this great work. Instead, many companies are laying lines across farm lands, leaving them as they are, causing a great loss to the farmer as well as themselves.

The remedy to this situation is four-

Fig. 3. The small depressions shown in this field will cause major erosion trouble unless given prompt attention.

fold. The pipe line companies must: 1. Get the farmer interested in terracing. 2. Cooperate with him. 3. Lend him their knowledge and services. 4. Continue their part of the maintenance problem on the terraces. This course, to the writer's belief, would unquestionably return more than its dollar

Terracing *to* Prevent Erosion Pipe Line Maintenance Costs

By D. H. FLOYD

Engineer, Oklahoma Division,
Southwest Gas Utilities Corporation,
Ada, Okla.

and cents costs to the farmer and the company. The farmer would retain the fertile soil and the pipe line company would cut down maintenance expense to the minimum.

Causes and Forms of Erosion

Erosion is caused chiefly by the direct action of heavy rains beating upon the ground; by the rapid movement of the rain water down the slopes of the land surface; and by the combined action of the freezing and thawing of a staurated soil, followed by heavy rains. Fig. 1 illustrates gully washing, which should be taken seriously by companies owning pipe lines that run over such area. This could be remedied very easily, at little expense, by cooperating with the land owner and terracing such areas. The steeper the slope the greater is the erosive action of running water. To illustrate, if the slope be increased four times, the velocity of the water down the slope is about doubled and the power of the water to carry away soil particles is increased about 32 times.

Rows that run up and down the slope, when cultivated, form small ditches that concentrate the water and increase the amount of erosion. A company owning pipe lines over such ground by all means should encourage the farmer to change the direction of his rows, which would reduce maintenance expense to a minimum for the company owning the line, and would conserve soil for the farmer.

Where channels are washed down the slope by large volumes of water flowing over narrow strips of ground, gullying occurs. This type of erosion generally begins in depressions or draws. (Fig. 3).

This type is very dangerous to a pipe line, and is readily prevented where terracing is begun in due time.

Methods of Preventing Erosion

Since erosion is caused largely by the rapid movement of rainwater over the surface of the ground, methods of preventing erosion must be directed toward causing the water either to sink into the soil or to flow away slowly over the surface to a drainage channel.

In order to take up surface water rapidly a soil must be very permeable, which means that it must contain fairly large open spaces through which the rainwater can pass easily, or in which it can be stored temporarily. Some soils are naturally very permeable; those that are not can be rendered more permeable by deep plowing; by plowing under organic matter such as manure, stubble, stalks and cover crops; and by the practice of tile drainage.

Vegetation which covers the surface of the ground protects the soil from the direct action of the rain and checks the flow of water over the surface, thus giving the soil a better chance to absorb the water. It is therefore, important that some kind of cover crop such as vetch, clover, oats, wheat or rye be grown on the land during the winter or any time that the land is not to be used for other crops.

Contour plowing, which consists of breaking the ground along level lines across the slope, reduces the flow of water directly down the slope. In planting and cultivating the crops the same level lines are followed, so that a shallow trough is made above each row, which catches and holds some of the rain water until it is absorbed by the soil. Contour plowing should invariably be practiced on all hill lands. A great many gullies are caused in the beginning by the practice of plowing and cultivating directly up and down the slope.

Terracing is the most effective method of preventing erosion, and it is doubly effective when all of the above precautions are employed in connection with it.

There are two classes of terraces, the Mangum and the Level types, generally found best adapted to conditions of the United States. The Mangum terrace is a broad base, ridge type of terrace with a variable grade; the level terrace is similar except that it has no grade or fall. Both can be crossed readily by modern farm machinery and without injury to the terraces. They may be planted to crops and cultivated together with the rest of the field. No other type of terrace presents these advantages.

Terracing Procedure

Pipe line companies which are interested in the terracing problem should know the general principles of locating, running, building and maintaining terraces from an engineering viewpoint. Therefore, the following brief discussion of terracing procedure is offered.

The first four steps to consider in terracing are:

(Continued on Page 68)

Fig. 4. Illustrating a piece of land which has been properly terraced. Fig. 5 (Right). A farm adjoining the one shown in Fig. 4 at the left. This farm was not terraced and as a result pipe lines are showing due to soil erosion.

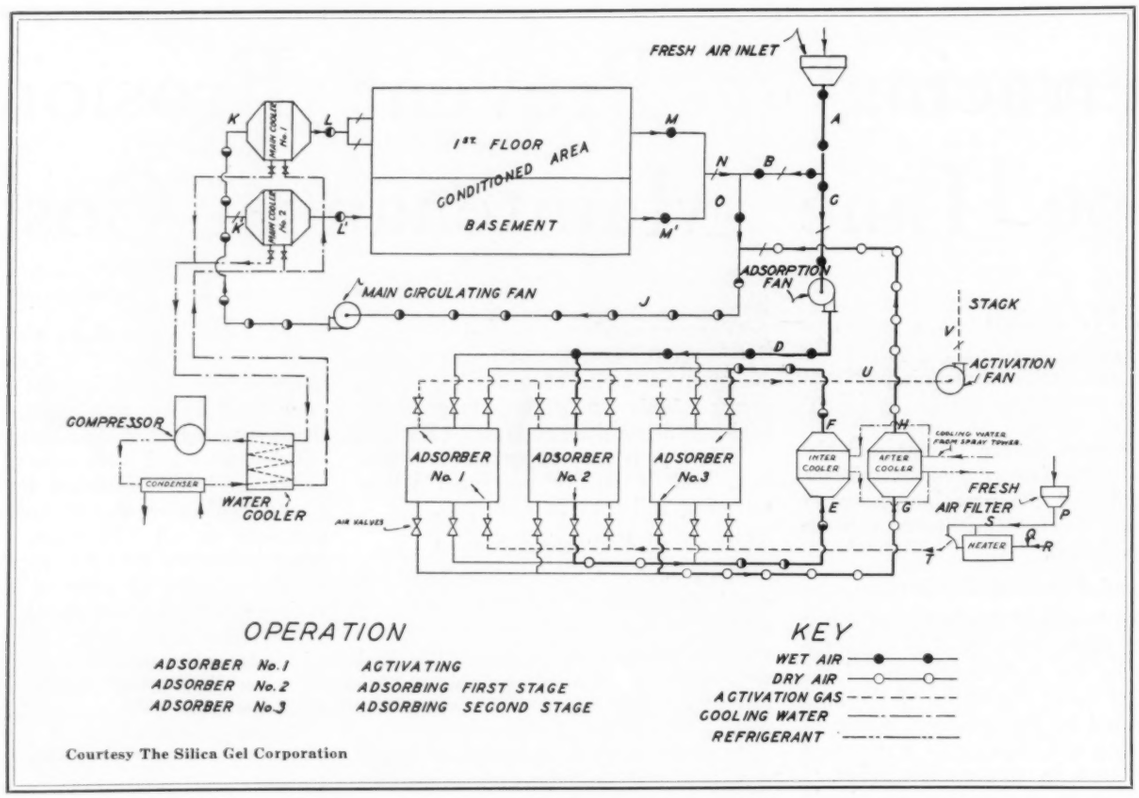


Fig. 1. Flow sheet showing cycle of air conditioning operations in Dallas Gas Building installation.

Air Conditioning *by* Gas

In the New Gas Headquarters at Dallas, Texas

By L. A. BICKEL

The Dallas Gas Company
Dallas, Texas.

AIR conditioning by gas was introduced to the Southwest September 8, 1931, when the doors of the new Dallas Gas Building were opened to the public.

L. A. Bickel

On this particular day the outside temperature was 93°F., and the relative humidity 37 per cent—an uncomfortable condition. Just inside the building the temperature was 81°F., and the relative humidity 40 per cent—a condition which gave one the sensation of balmy spring weather.

Four principal conditions are necessary for body health and comfort:

1. Sufficient quantity of clean, fresh air.
2. Proper dry bulb temperature.
3. Proper wet bulb temperature, which in turn indicates the relative humidity.
4. Proper air velocity.

Heretofore item 3 has been very much neglected, due to the fact that the removal of moisture from the air by means of mechanical refrigeration has not proven economical. For instance, to meet the opening day conditions it was necessary to remove from each cubic foot of fresh air supplied to the conditioned area about 2 grains of moisture in addition to cooling it to the proper temperature. The removal of the moisture required about .3 B.t.u., while cooling required about .2 B.t.u. The latter is taken care of by refrigeration, while the former is cared for entirely by a method described below, using a direct gas fire in its cycle of operation. In this manner about 60 per cent of the load on the refrigerating equipment is eliminated by the substitution of the Silicia Gel dehydration plant.

Essentially the plant consists of a Silica Gel dehydration plant and a mechanical refrigerator to cool the air after the proper relative humidity has been obtained. Experiments are now being being conducted on a gas-fired refrigerator of a capacity sufficient to replace the mechanical one and it is hoped that this can be accomplished before next summer. Heretofore, development has been on small units only.

The plant's cycle of operation may be traced on the flow sheet, Fig. 1: (Follow the arrows)—Fresh air is drawn through the air filter A on through C by the adsorption fan and through D into adsorber No. 2, where the air passes through beds of Silica Gel which

adsorb water vapor from it. Removal of this moisture releases the latent heat of vaporization and as a consequence the temperature of the air leaving adsorber No. 2 will be about 125°F., depending on the moisture content of the fresh air. After leaving adsorber No. 2 the air passes through E into the intercooler which is a fin-type cooler with water from the spray tower on the roof circulating through its coils. This reduces the temperature of the partially dry air to about 90°F. From the intercooler the air passes on through F into adsorber No. 3, where it again passes through beds of Silica Gel to remove the remaining moisture. Again the temperature of the air is raised to about 110°F. It then passes on through G into the after-cooler which is identical to the intercooler. As a result of this we have at H a "bone-dry" air at about 90°F. This air is then carried over to the circulating air duct and blended with it to obtain the proper relative humidity. This ratio is maintained by means of a damper in the "bone-dry" air duct controlled by a humidity controller. The air, after being blended to the proper relative humidity, passes on through I, through the main circulating fan and through the main coolers, where it is cooled to the desired temperature. The main coolers are similar to the intercooler and after-cooler except that cold water at about 50°F., circulates through the coils instead of water from the spray tower, the water being circulated from the refrigerating unit. "Made to order" air then discharges from L and L′ into the building, leaving at M and M′ and back through O ready again to repeat the cycle.

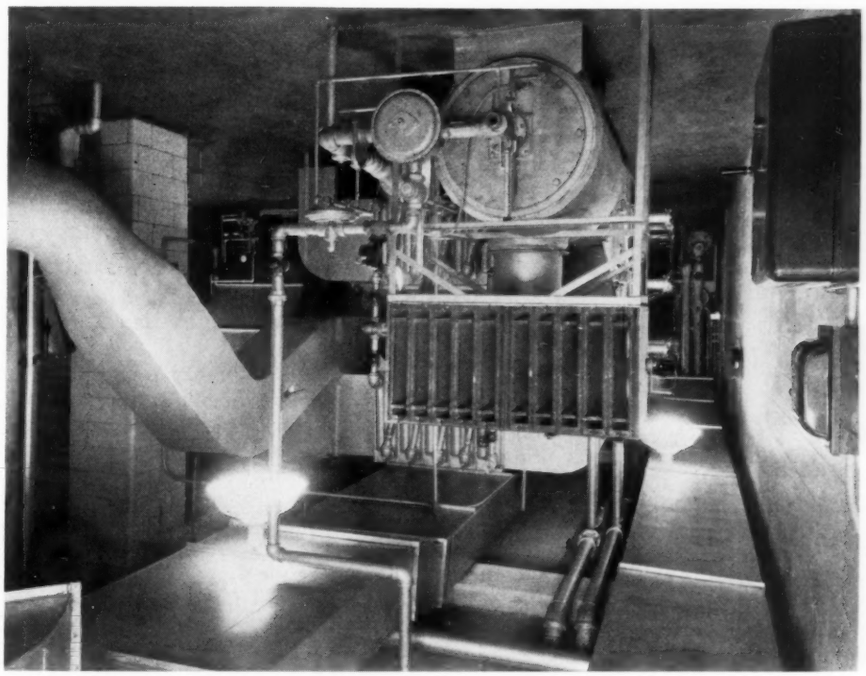


Fig. 3. View of gas-fired activation furnace.

While beds No. 2 and No. 3 are adsorbing, as described above, No. 1, which has just been used, is being activated or dried out. This is accomplished by passing air at about 350°F., through the saturated gel beds, removing the moisture and again preparing it for adsorption. This air is heated by means of an air heater (Fig. 3) passing it through T and into adsorber No. 1, out through U and on out the activation fan to the stack. The activation period is 30 minutes, after which the fire is turned off and air at room temperature is drawn through the gel for 10 minutes to cool it. It is now ready for use again.

The timing devices which operate the valves to the various beds of Silica Gel and controls the gas furnace for activation are entirely automatic, being controlled by means of cams driven by an electric clock. The timing is such that there are always two beds of gel adsorbing. The fresh bed each time is switched to second stage adsorption and the bed which has been on the second stage is switched to the first. This is done to bring the fresh air through the wettest gel first. The beds are 40 minutes on each stage, making a total adsorption time of 80 minutes for each one. For example, we shall trace a bed of gel or adsorber through a cycle: The gel has just been activated and is switched to the second stage adsorption where it remains 40 minutes. It is now switched to first stage adsorption where it remains another 40 minutes. It is now ready for activation which operation requires another 40 minutes, as previously explained, making the total cycle in 120 minutes or 2 hours.

The cubical content conditioned by this unit is 161,600 cubic feet, with a circulation of 23,300 cubic feet of conditioned air per minute, providing a complete air change every 7 minutes. The average requirements of "bone-dry" air have been about 3,500 cubic feet per minute and the gas used for activation

(Continued on Page 60)

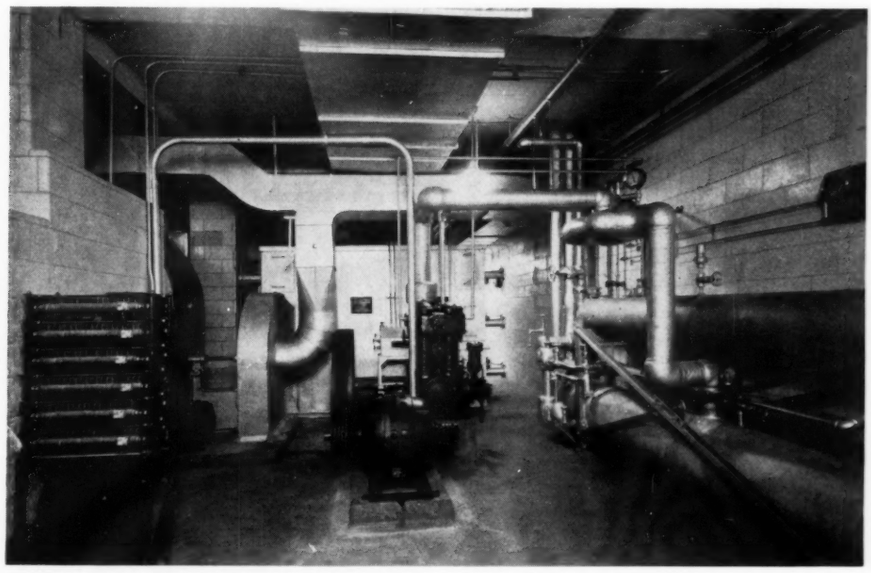


Fig. 2. Showing Silica Gel dehumidifying plant, in background, and refrigeration machinery.

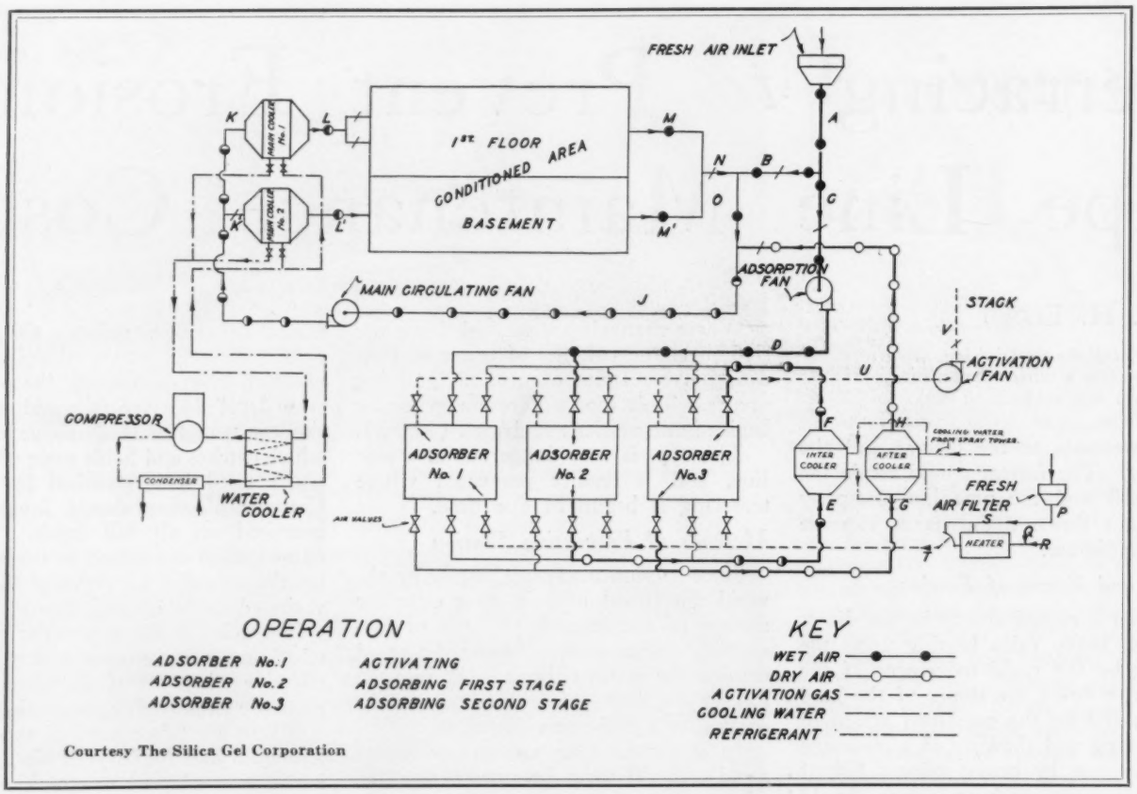


Fig. 1. Flow sheet showing cycle of air conditioning operations in Dallas Gas Building installation.

Air Conditioning *by* Gas

In the New Gas Headquarters at Dallas, Texas

By L. A. BICKEL

The Dallas Gas Company
Dallas, Texas.

L. A. Bickel

AIR conditioning by gas was introduced to the Southwest September 8, 1931, when the doors of the new Dallas Gas Building were opened to the public.

On this particular day the outside temperature was 93°F., and the relative humidity 37 per cent—an uncomfortable condition. Just inside the building the temperature was 81°F., and the relative humidity 40 per cent—a condition which gave one the sensation of balmy spring weather.

Four principal conditions are necessary for body health and comfort:

1. Sufficient quantity of clean, fresh air.
2. Proper dry bulb temperature.
3. Proper wet bulb temperature, which in turn indicates the relative humidity.
4. Proper air velocity.

Heretofore item 3 has been very much neglected, due to the fact that the removal of moisture from the air by means of mechanical refrigeration has not proven economical. For instance, to meet the opening day conditions it was necessary to remove from each cubic foot of fresh air supplied to the conditioned area about 2 grains of moisture in addition to cooling it to the proper temperature. The removal of the moisture required about .3 B.t.u., while cooling required about .2 B.t.u. The latter is taken care of by refrigeration, while the former is cared for entirely by a method described below, using a direct gas fire in its cycle of operation. In this manner about 60 per cent of the load on the refrigerating equipment is eliminated by the substitution of the Silicia Gel dehydration plant.

Essentially the plant consists of a Silica Gel dehydration plant and a mechanical refrigerator to cool the air after the proper relative humidity has been obtained. Experiments are now being being conducted on a gas-fired refrigerator of a capacity sufficient to replace the mechanical one and it is hoped that this can be accomplished before next summer. Heretofore, development has been on small units only.

The plant's cycle of operation may be traced on the flow sheet, Fig. 1: (Follow the arrows)—Fresh air is drawn through the air filter A on through C by the adsorption fan and through D into adsorber No. 2, where the air passes through beds of Silica Gel which

adsorb water vapor from it. Removal of this moisture releases the latent heat of vaporization and as a consequence the temperature of the air leaving adsorber No. 2 will be about 125°F., depending on the moisture content of the fresh air. After leaving adsorber No. 2 the air passes through E into the intercooler which is a fin-type cooler with water from the spray tower on the roof circulating through its coils. This reduces the temperature of the partially dry air to about 90°F. From the intercooler the air passes on through F into adsorber No. 3, where it again passes through beds of Silica Gel to remove the remaining moisture. Again the temperature of the air is raised to about 110°F. It then passes on through G into the after-cooler which is identical to the intercooler. As a result of this we have at H a "bone-dry" air at about 90°F. This air is then carried over to the circulating air duct and blended with it to obtain the proper relative humidity. This ratio is maintained by means of a damper in the "bone-dry" air duct controlled by a humidity controller. The air, after being blended to the proper relative humidity, passes on through I, through the main circulating fan and through the main coolers, where it is cooled to the desired temperature. The main coolers are similar to the intercooler and after-cooler except that cold water at about 50°F., circulates through the coils instead of water from the spray tower, the water being circulated from the refrigerating unit. "Made to order" air then discharges from L and L′ into the building, leaving at M and M′ and back through O ready again to repeat the cycle.

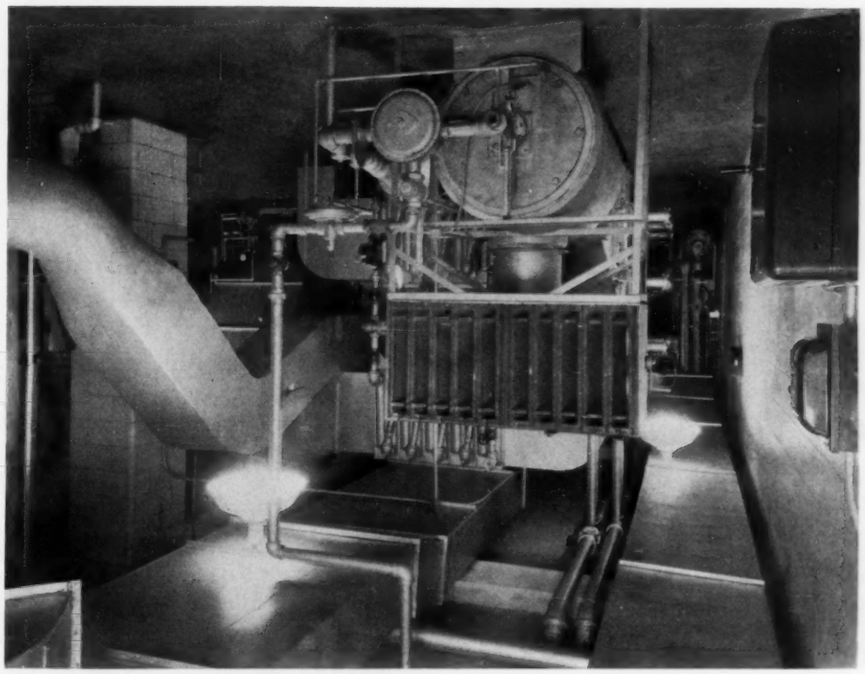


Fig. 3. View of gas-fired activation furnace.

While beds No. 2 and No. 3 are adsorbing, as described above, No. 1, which has just been used, is being activated or dried out. This is accomplished by passing air at about 350°F., through the saturated gel beds, removing the moisture and again preparing it for adsorption. This air is heated by means of an air heater (Fig. 3) passing it through T and into adsorber No. 1, out through U and on out the activation fan to the stack. The activation period is 30 minutes, after which the fire is turned off and air at room temperature is drawn through the gel for 10 minutes to cool it. It is now ready for use again.

The timing devices which operate the valves to the various beds of Silica Gel and controls the gas furnace for activation are entirely automatic, being controlled by means of cams driven by an electric clock. The timing is such that there are always two beds of gel adsorbing. The fresh bed each time is switched to second stage adsorption and the bed which has been on the second stage is switched to the first. This is done to bring the fresh air through the wettest gel first. The beds are 40 minutes on each stage, making a total adsorption time of 80 minutes for each one. For example, we shall trace a bed of gel or adsorber through a cycle: The gel has just been activated and is switched to the second stage adsorption where it remains 40 minutes. It is now switched to first stage adsorption where it remains another 40 minutes. It is now ready for activation which operation requires another 40 minutes, as previously explained, making the total cycle in 120 minutes or 2 hours.

The cubical content conditioned by this unit is 161,600 cubic feet, with a circulation of 23,300 cubic feet of conditioned air per minute, providing a complete air change every 7 minutes. The average requirements of "bone-dry" air have been about 3,500 cubic feet per minute and the gas used for activation

(Continued on Page 60)

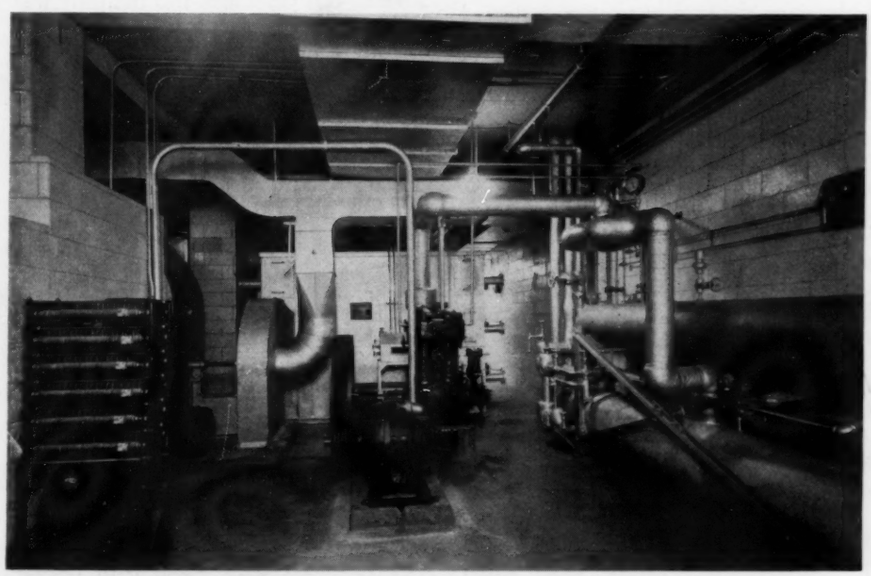


Fig. 2. Showing Silica Gel dehumidifying plant, in background, and refrigeration machinery.

Tell *the* Public . . . *Ahead of Time*

By JAMES H. COLLINS

"HOW can you publish such lies?" asked a gas utility executive, indignantly, speaking to the proprietor of a local newspaper. The Third Ward Mercantors had passed a resolution denouncing his company's appliance merchandising, and the paper had reported the meeting.

The gas man proceeded to tell the publisher some plain truths about appliances—how new inventions are constantly appearing, which must be made known to the public before merchants will stock and sell them.

"Why, that seems to be in the public interest!" agreed the newspaper man. "But why have you kept it so secret? Why not tell people, and get their support?"

Why, indeed!

Business is constantly getting into picklements of public misunderstanding, due to its supposed secretiveness. But the fact is that nobody in the business concern under suspicion, or attack, has taken the trouble to explain matters to the public, at a time in the development of improvements or expansions when a little frankness in giving out information would have established public understanding, and created good will.

JAMES H. COLLINS

Who writes a series of gas appliance messages to utility patrons, by arrangement with "Western Gas."

In the utility field, this supposed secretiveness has made endless trouble. Motives and policies in a matter like appliance merchandising are not explained at the proper time. Opportunities are opened for attack. When it is under fire, the company endeavors to explain. Its explanation must then be defensive. The terrible accusation of "Propaganda!" is raised—and with every chance of making it stick.

▼

Good public relations are much like good physical plant. Both should be planned at the same time, and built together.

Looking ahead, at curves of community growth, the engineers design plant improvements and enlargements. Three years from now, there will be more customers, and more appliances available per customer. If the promotional job is rightly done, gas refrigeration, gas-fired laundry apparatus, equipment for gas heating and cooling of homes, will be boosting the load in an unprecedented way.

The public understands the work of the construction crews, but even business men do not realize that new ideas of comfort and convenience must be laid in the public mind at the same time that the new mains are being laid.

The gas company sells gas, and nobody has ever complained of its enterprise in doing so. To sell gas, it must sell appliances. Before the load can be boosted with new appliances, it must sell ideas.

Any live merchant understands the value of new ideas in the community, to himself, as a basis of increased sales. And he knows full well the difficulty and cost of pioneering unfamiliar ideas and merchandise.

The popular education which is necessary if the gas company is to get full benefit from its plant extensions, should go hand in hand with the engineering plans — and should start well ahead of the construction.

Happy public relations are largely a matter of teaching.

No public service corporation enjoys greater good will than Bell telephone. Twenty-odd years ago, this company was under attack, as a monopoly. Instead of fighting a defensive battle, Bell officials planned an educational campaign, to teach the public something about telephone service, and show where that service benefited the public. In a little while, instead of defending itself under fire, the company was building new revenue.

▼

The public must be asked to attend a school. It need not do so, and will not, unless the lessons are interesting, and of value to itself.

But, by planning public relations far enough ahead, it is possible to explain company policies before they are misunderstood—or purposely misinterpreted by those who make capital out of harassing the utility companies. The necessary new ideas are built along with the engineering plant, and when both are completed, they click into operation together.

The Barrel of Gas

By JAMES H. COLLINS

▼

A dear old Irishman applied for a job at the gas works, saying that he could do anything.

"Can you wheel out a barrel of gas?" asked the foreman.

"Sure! Just fill it up for me!"

◆ ◆ ◆

Once, gas men had to find a way of filling up a barrel of gas—and here is how that was:

The gas pipes were laid under

Installment No. 1 in a series of consumer messages on gas appliances.

every street in town and into every house, and gas was good, and cheap, and ready to cook chops, boil baby's bottle, and heat a hall or a whole house.

But people had no gas ranges or heaters—no *appliances*, as gas men say.

You can pipe gas into the home, but unless people have appliances, to get the benefit of gas service, you might just as well bring it loose in a barrel.

◇ ◇ ◇

Well, inventors were constantly making better appliances. Gas men were engineers, and tested each new range and heater, and knew which gave the best service, at the lowest expense, with the longest life.

How could this engineering progress be put at the service of the public?

◆ ◆ ◆

At that time — some few years ago — not many storekeepers carried modern gas appliances, because they said, "Our customers never ask for such things."

So the gas men set up shop themselves!

Showrooms were opened, where people could see the latest things, and have them explained by attendants who helped pick out the best appliance for a particular purpose.

Thus, engineering knowledge was linked to the public's need for modern gas service, and before long, enterprising merchants began selling the latest appliances.

They saw that the gas men were doing an educational job, helping the public attain better standards of living. That always creates new customers for the merchant who knows how to follow up.

And so the witty old Irishman wheeled out the barrel of gas!

◆ ◆ ◆ ◆

See the Newest
GAS APPLIANCES
AT YOUR DEALER'S...or

Name and Address of
YOUR GAS COMPANY
in this space

COPYRIGHT 1931
WESTERN BUSINESS PAPERS, INC., L. A.

A Chat *with* Your Consumers *about* Gas Appliances

GAS company managements everywhere have taken thoughtful notice of the anti-utility merchandise movement which has come to a head in almost a score of our state legislatures this past session. Quelled or halted in most states, the issue is yet one which will arise repeatedly. No company, can afford to take an apathetic stand on the merchandising situation.

Fundamentally, the reason for anti-merchandising agitation comes back to the utility's own door. It is the penalty which we are paying for having neglected to tell the facts about utility merchandising. Some companies may face local conditions which are peculiarly acute; some companies may need to improve their trade practices—but primarily, the reason why anti-merchandising sentiment can gain headway is that the utility has never told its story.

Now that the seriousness of the issue is generally recognized, every company is checking over its own situation, contacting dealers, strengthening cooperation, bettering the all-around merchandising set-up in many ways. This is as it should be.

And the alert management will look first of all to its own consumers in this program. Here rests the utility's best assurance that its interests in merchandising are safe for the future—with consumers who *know* the justice and the economic necessity for utility merchandising and load promotion.

To help in this work, *Western Gas* has had prepared a series of friendly messages which many companies will find it of advantage to distribute to their patrons—as envelope stuffers, for counter distribution, or by other means. Benefits which come both to public and to dealer from gas company merchandising will be presented.

James H. Collins, who writes the "text" of these messages, is a journalist of national note—for 20 years a contributor to the "Saturday Evening Post" "Country Gentlemen", and known to the utility industry as a writer in "Utilities Fortnightly." He knows the advantages which come from utility sales effort, and is ably qualified to bring them to the consumer in a friendly, interest-compelling style.

These chatty appliance talks are enlivened with cartoons by Billy Cam, widely known as a Sunday supplement illustrator for features by Ring Lardner, Will Rogers, and similar talent.

It is impossible, of course, to make every message exactly fit each local condition—but the *Western Gas* series is carefully designed to present the subject in a variety of ways, and to cover all of the essential points which call for utility sales work.

These appliance messages, the first of which is illustrated above, are in the form of four-page, one-fold pamphlets, and are being produced at low cost to enable gas companies to do a complete job of consumer coverage.

Fundamentals *of a* Gas Heating Sales Program

By F. U. NAYLOR
Manager Gas Sales,
Pacific Gas and Electric Company

NEED for full cooperation of gas company, equipment manufacturer, and dealer —effective use of heating proposal forms—price maintenance —long term financing for both company and dealer sales—summer promotion—conversion burner installations as a stimulus to gas furnace sales—these and other elements in the successful househeating sales program are touched upon in this discussion, given before the Pacific Coast Gas Association's Commercial Section at the September San Francisco Convention.—EDITOR.

GAS heating sales problems involve the gas company, heating equipment manufacturers and heating dealers. A discussion of selling problems presupposes that the gas company has determined it wants the gas heating load and has, therefore, formulated proper rates to obtain it on a desirable basis.

The sale of gas heating equipment is a job for the gas industry as a whole; that is, the united and cooperative effort on the part of heating dealers and the gas company, aided by the selling equipment manufacturers, is necessary if any program of building gas heating sales is to achieve the fullest measure of success.

Use of Proposal Forms

The basis of any gas heating sales program should be that of featuring only appliances which are approved by the American Gas Association, sold with adequate capacity and properly installed. As an aid to this problem, it is not only necessary to have a standard code, but to make effective use of a heating proposal form. The gas company, as part of its advertising program, should stress to its consumers the importance of insisting on A.G.A. approved appliances with the proposed installation specified on some standard form. The use of a heating proposal form enables the prospect to see that he is obtaining a proper installation and that A.G.A. appliances of adequate capacity are to be used. Furthermore, should the prospect entertain a bid from competitors, the prospect is less likely to favorably consider such, unless he can be shown in some definite manner just what the competitive bidders are proposing to install. It should be a responsibility of the manufacturers of gas heating equipment to formulate heating proposal forms particularly adapted for use in the sale of their appliances, whether sold by gas companies or heating dealers. From the appliance manufacturer's viewpoint, the use of such a form in the sale of his equipment is a means of insuring correct representations and fostering proper installations, all of which means good advertising for his equipment by satisfied users.

The Potential Market

It goes without saying that a survey of the potential market for gas heating should be made before any sales program is completely formulated. The types of houses or buildings that represent the potential market indicate whether central or small unit types of heating appliances should be featured. Assuming that all types of heating appliances are given an equal part in the gas heating sales program, the advertising and sales effort that is planned should not overlook the fact that the consumer is best served when equipment is sold which not only meets his requirements, but which is within his means to *purchase and to use*. It is quite conceivable that some prospects may not be able to afford the cost of a gas heating installation to adequately heat their entire home or building. If gas heating appliances are to be sold to such prospects, it is necessary that their ability to buy the equipment and to subsequently operate it be faithfully considered. In discussing this phase of our sales problem we must admit that a majority of our potential heating prospects, at least in the residential field, are consumers whose average monthly income does not exceed $200 a month. If an attempt is made to sell to some prospects heating equipment for their entire home or building, a sale may be lost; because the consumer may temporarily be necessarily satisfied with having only a portion of the home or building properly heated. The use of a heating proposal form is an aid to the solution of this problem, because the prospect can be presented with a proposal to adequately and properly heat the job in question, or with an amended proposal which would make it clear that, with the money available, a proper heating installation is to be made to heat only certain portions of the building or home.

Avoid Price-Cutting

The gas heating industry should avoid the temptation to cut prices on equipment or installation work. It is a proven fundamental in industries that sell specialty types of appliances that their selling problem to obtain volume of business is not solved by unnecessary cutting of prices. A survey has shown that price cutting and new low priced models have proved but little aid in working out of current sales slumps.

The necessity for liberal terms and the financing of installment sales is a problem general to all types of merchandising. Students of business have shown that the volume of term sales represents the same percentage of total sales during the current year as it did in good times; when the level of purchasing power was supposed to be much higher; and, therefore, it cannot be said that our current depression was caused by an over-extension of installment selling. The everyday campaign for a share of the buyer's dollar on the part of other industries selling furnishings for the ture of liberal terms. In the electric

(Continued on Page 64)

Why Not Call for Quotations on Pipe Line *Protection?*

By K. H. LOGAN

*Chief of the Underground Corrosion Section, Department of Commerce, Bureau of Standards**

PIPE line protection is an economic problem. Every time a new pipe line is laid or an old one reconditioned, someone must decide whether it should be protected against corrosion. The question should be answered by comparing the saving resulting from protection with the cost of that protection. Such a comparison should be made, notwithstanding the difficulty of evaluating the hazard caused by leaks and the inadequacy of the data on soils and coating materials.

In any such economic study of pipe line protection there are but two fundamental factors—the corrosiveness of the soil, and the effectiveness of the protection. Each of these must be assigned a value in terms of pipe life.

Factors in Protection

Soil maps and pipe line experience indicate that in many localities the corrosiveness of soils may change radically within a short distance, and that frequently a very corrosive soil has an extent of only a few hundred feet, or even less.

It is also known that a number of things other than the inherent properties of the soil influence the rate of corrosion of a line. For these reasons it may never be practicable to predetermine accurately the life of a pipe line. Nevertheless it has been shown that soil characteristics play a very important part in corrosion, and that it is now possible to foretell the corrosiveness of soils in the western part of the country with a fairly satisfactory degree of accuracy.

Much information has also been accumulated concerning protective coating materials. The value of thin coatings appears questionable and it is probable that to be effective, a bituminous coating must be heavier than many of those heretofore used. Indications are that materials suitable for some soil conditions may prove unsatisfactory in other soils. A large percentage of failures of coatings is attributable to improper application of inherently good material. Few pipe line owners appear to realize the difficulties involved in the proper application of protective coatings. Attention is here called to the fact that it is data on the entire cost of the protection, and the extent of that protection furnished, that must be determined before the problem can be solved. The purpose of this paper is to suggest the advantages of purchasing protection, rather than pipe coating materials.

Why Buy Protection?

Several marked advantages would result from the purchase of pipe line protection. The most obvious advantage is that the purchaser would be buying directly what he needed, with a definite understanding of what was to be furnished and at what total cost. He would therefore be better able to decide whether the investment were justified.

Since the failure of a protective coating may be the result either of poor or unsuitable materials, or of improper treatment or application of the materials, the pipe line owner is seldom able to fix the responsibility for the failure, but the purchaser of protection would know definitely who was responsible for the success or failure of the protection. He need not concern himself with the reasons for failure or success.

The business of the pipe line operator is the economical operation of the line. He is concerned with its preservation, but the means of accomplishing this may well be delegated to specialists. These specialists should be able to furnish more positive protection, quickly applied, at a smaller cost, than the pipe line operator who can devote but a small part of his thought and time to the study of soil characteristics, properties of bituminous materials, and methods of application.

There is at present a considerable amount of uncertainty in the minds of many pipe line operators as to where, and with what, to protect their lines. They have heard that serious corrosion occurs only on a small percentage of most lines, and they have been more impressed by the reports of failures of coatings than by claims of service. Unfortunately the talks of coating salesmen differ chiefly in that the more responsible ones are the more conservative in their statements. Undoubtedly, properly selected materials, properly applied, will prolong the life of a pipe line. What the maker of an effective means of protecting a pipe most needs is a method of convincing pipe line owners that it pays to protect lines. An offer to supply guaranteed protection at an acceptable cost should convince the pipe line operator of the value of protection, and result in sales of protection for many lines which would otherwise be unprotected. The coating manufacturer who directly or through a contractor, offers to furnish protection for the performance of which he is willing to assume full responsibility, would certainly have a decided advantage over one who

IN ADVANCING the suggestion that pipe line operators buy guaranteed protection rather than merely protective materials, the author holds forth the following advantages, which in his opinion would result:

The purchaser would receive something definite and could predetermine whether such a purchase was economical. The responsibility for the performance of the coating would rest with one organization, and this would result in greater care in selecting and applying materials, and in a lower cost of pipe line protection. Responsible coating manufacturers would also be benefited because of the elimination of competitors who could not guarantee the performance of their products.

Mr. Logan's remarks were read before a meeting of Pacific Coast gas and oil company engineers, called together July 1 in Los Angeles by W. M. Henderson, then chairman of the Pacific Coast Gas Association Technical Section.—EDITOR.

*Publication approved by the Director of the Bureau of Standards of the U. S. Department of Commerce.

asked the pipe line owner to take whatever risk was involved.

To Secure Protection

In applying the idea of purchasing pipe line protection, the operator of the line would first consider the available data on soils through which the line would pass. If experience on parallel lines indicates that a very large part of the line would be exposed to corrosive soils, little would be gained by making a soil survey for the purpose of determining what parts of the lines need protection. The same thing is true if a very large portion of the line is located in non-corrosive soils.

If the locations and extent of the corrosive soils are unknown, the first step is to have a thorough soil corrosion survey made, preferably by one familiar with soils. This is necessary since the ability to recognize changes in soils by topography and vegetation will materially reduce the cost of the survey and increase the probability that all the corrosive spots will be located. The results of the survey would be expressed in terms of pipe life, although the best that can be done is but a rough estimate. A satisfactory survey of a right of way could probably be made by one familiar with soils and survey methods, for less than one per cent of the cost of the line. The report should then be prepared showing the location of the parts of the line to be protected; their distances from towns and freight depots; the character of the soils, and the conditions under which the protection must be applied. A few coating contractors or manufacturers should be furnished this information and invited to submit bids for the protection of the line for such a time as the bidder or the line owner wished to specify. The penalty for failure to protect the line and the evidence that the contract would be carried out should be agreed upon before work is begun. For example, the contractor might furnish a bond guaranteeing the payment of a certain sum for each length of pipe found to be pitted to more than half the wall thickness, during the period specified. The sum might be sufficient only to cover the cost of repairs, or adjusted in proportion to the service that the coating had rendered prior to the discovery of the pit or leak. Such a bond would of course add somewhat to the cost of the protection, and might be dispensed with in case of bidders of established reputation.

As an alternative, bids might be asked to furnish and apply a coating of specified materials, or having specified characteristics at the time the line is placed in the trench. In this case, the bidder would be responsible for certain specified physical and chemical characteristics of the materials used and for the character of the application, but not for the service rendered. This latter proposal has two serious weaknesses. The first weakness is that it divides the responsibility for the protection of the line. If the coating fails, the one who applied it will claim poor materials were specified, and the maker of the materials will assert that the materials were satisfactory, but were mistreated or improperly applied. The other objection is that there are no recognized standards for specifying a protective coating, either by the properties of the materials or even by trade name. While the first form of bid would give the purchaser the more definite data on which to decide on his protection, either form would result in a better and less expensive job of protection than usually results from the application of materials by a pipe line construction crew.

If protection for a definite time is offered, the award of the contract would depend largely on the responsibility of the bidder, the conditions under which he would do the work, and the total cost of the protection.

Some Objections

There are a number of more or less valid objections to the proposal that the pipe line owner purchase protection rather than materials. It may be pointed out that it is not usual for manufacturers to furnish a finished product. The operator of a sawmill does not undertake to build houses and the manufacturer of a protective coating material may be unprepared to apply his product to pipe lines. Nevertheless, there should be someone who will contract to furnish protection just as there are many who will agree to construct a building, and economy should certainly result from pipe line protection being undertaken by someone specializing in such work.

The service of some products cannot be guaranteed because their treatment by the purchaser cannot be foretold. Thus, the manufacturer of an automobile can only guarantee his machine to be free from defects of material and workmanship as indicated by its performance during the first three months. Certain manufacturers of tires guarantee satisfactory service, while others guarantee a definite mileage, although the tire may be mistreated. Other products are subject to little abuse and such products (certain types of roofs for example) may be guaranteed for long periods. Protected pipe lines are subject to very few conditions which cannot be recognized at the time the line is laid, and the effects of most of these which might injure a protective coating are easily identified. It is not unreasonable, therefore, to expect one who can furnish satisfactory protection to be willing to guarantee its performance.

At present there are a few organizations that will undertake to apply coatings to pipe lines. Most of these merely offer to apply the materials selected by the pipe line owner, and consequently cannot guarantee the protection offered. One organization, however, is said to offer protection to a line for a specified number of years, and undoubtedly others will do likewise if pipe line operators made it clear that they were not interested in materials as such, but only in protection.

A second difficulty with the proposed plan is that the data on the characteristics of soils with respect to corrosion, and the behavior of protective coatings are meager. Under these present conditions a contractor who offered protection would be accepting considerable risk, because he could secure but little information as to the probable effect of the soils to be encountered on the type of material he wished to use. The advertisements of manufacturers of protective coatings indicate that a very considerable number of coating materials are quite satisfactory. Whatever the risk to the contractor in offering protection, it would be less than that which the pipe line owner is now expected to assume, since the contractor in a short time at least would be better informed as to coating materials and methods, and could to a large extent control both.

The pipe line operator may object that pipe lines are usually built as rush jobs, that the contractor building the line is expected to maintain a rather definite and high rate of construction, and that the application of coating by another contractor would add to the confusion and delay the work.

It is largely because of the speed required in pipe line laying that the purchase of protection, rather than materials, is advisable. The proper application of the coating materials requires time and satisfactory conditions of weather and pipe surface. Frequently, in present practice, the haste with which lines are constructed prevents the proper application of protective coatings. If a coating is to be applied, it should be applied properly, and for lines of considerable length it is probable that a coating contractor could do a satisfactory job more quickly than anyone not specializing in this work.

Frequently, the purchaser does not realize that the best materials will give

(Continued on Page 64)

Oklahoma Natural Gas Corp. In New Rate Reduction

Lower gas rates are being placed in effect voluntarily by Oklahoma Natural Gas Corp., Tulsa, with the reading of its customers' meters on and after October 1. This rate reduction is the second to be made this summer by Oklahoma Natural.

The new rate for residential and commercial service in about 50 cities and towns will be 45 cents per 1,000 cu. ft. for the first 100,000 cu. ft. of gas used a month, and 18 cents per 1,000 cu. ft. for all over 100,000 cu. ft. a month.

Acceptance of this rate was made at a hearing on August 15, before the State Corporation Commission at Oklahoma City. It was offered by E. A. Olsen, executive vice-president, who voiced the company's desire to give its customers the immediate benefit of lower rates, rather than wait a year for the termination of valuation proceedings.

Important Decision in Ohio Gas Co. Case in Supreme Court

The United States Supreme Court in the case of the East Ohio Gas Co. vs. The Tax Commission of Ohio, has held that receipts from the sale of gas piped from other states may be included in the basis of a state gross receipts tax for the privilege of conducting intrastate business. This decision is regarded as one of the most important affecting the natural gas industry in recent years. The East Ohio company, during the time involved in this case, imported nearly 80 per cent of its gas from West Virginia and Pennsylvania, the gas being in motion constantly from the producing fields to the consumer. The decision holds the gas to be interstate commerce until it reaches a local distribution system, but not thereafter.

Gas Service Scheduled for Cedar Vale, Kan., Around Oct. 15

G. W. Leighty, who has been granted a franchise in Cedar Vale, Kan., states that gas service will begin in that town by October 15, or at the latest by November 1. Mr. Leighty is reported to have negotiated for a supply of gas with W. H. Sproul, who will pipe the gas to the town from the Jonesburgh field in Belleville township. Mr. Sproul will deliver the gas to the pipe line operated by Mr. Leighty at a point near Chautauqua.

Geo. J. Burkhart Is Industrial Gas Engineer for Okla. Natural

George J. Burkhart has been appointed to the staff of the Oklahoma Natural Gas Corp., Tulsa, Okla., in the capacity of industrial engineer. Mr. Burkhart is a graduate of the University of Wisconsin and has been with utility companies in Milwaukee, Alexandria, Va., and Philadelphia.

Winterset Now on Natural Gas Service Through Iowa Power & Light

Natural Gas from the Panhandle-Chicago line was turned on in Winterset, Iowa, through mains of the Iowa Power & Light Co., on September 3. The company headquarters at Des Moines.

C. E. Smith Gets Locust Grove Permit

The board of trustees of Locust Grove, Okla., has granted a franchise for the service of natural gas to C. E. Smith, subject to the results of an election to be held later. Domestic rate is set at 50 cents per M.c.f.

Routes of the Northern Natural Gas Co.'s major extensions are shown above. The 16-inch line from near Mason City, projected to St. Paul and Minneapolis, is being constructed as far as Owatonna by December 1. The line from Sioux City to Sioux Falls is also 16-inch, and is scheduled for completion around Thanksgiving time.

Northern Natural Extends Service Areas

CONSTRUCTION operations being carried on under the direction of companies connected with Northern Natural Gas Co. with operating headquarters in Omaha, Neb., have pushed the natural gas frontiers many miles farther north during the month of September, and have brought additional transmission and service line mileage in existing service areas.

Construction got under way on the extension from a point near Mason City to Owatonna, Minn., early in September, with service scheduled to begin in Owatonna about December 1. The line is of 16-inch pipe, and will furnish gas in two score of towns in southern Minnesota. Plans for extending this line to Minneapolis and St. Paul are also under consideration, as well as an extension to Rochester. Truman Smith Co., Wichita, Kan., has the contract for construction of this extension, and has opened a branch office in the Farmers State Bank Building, Lake Mills, Iowa.

Work on the 90-mile, 16-inch extension to Sioux Falls, S. D., was begun about the 15th of September, when trenching operations started. Gas is expected to be available in Sioux Falls through this line in ample time for cooking Thanksgiving dinners. Sioux Falls Gas & Electric Co. will serve the gas. The line will extend from Sioux City, Iowa, to Elk Point, Neb. At Elk Point it will branch to Yankton and Sioux Falls. Estimates call for the expenditure of approximately $1,000,000, according to report. Two bridges will be built for the carrier, one over the Sioux River, the other over the Missouri.

The company is also reported to be planning to erect three regulator stations on this line. Fredell Construction Co., Denver, Colo., has the contract for construction of this extension, according to press dispatches.

In Nebraska, the Missouri Valley Pipe Line Co. has completed a line to Fremont, Dakota City, Bancroft, West Point and Ashland. Right of way was secured early in September and construction was expected to be complete about October 1 on branches to the following towns: Wayne, Wakefield, Emerson and Pender, Elmwood, Weeping Water, Palmyra, Adams and Johnson, Blue Springs and Wymore.

In Kansas, construction of the company's 26-inch line is going ahead at an average of about two miles per day. The crew working south from Clifton, Kan., had completed 20 miles of the line by September 1. The addition to the compressor station at Clifton, Kan., is also under construction.

Construction of the 16-inch extension from the main line to Des Moines, Iowa, was completed late in August, with distribution changes under way early in September.

Completion of the 50-mile Lake City-Manson branch to serve Dayton, Harcourt, Gowrie, Farnhamville, Lohrville, Lake City, Rockwell City and Manson was scheduled for October 1.

Kansas Commission to Call Gas Rate Conference

The Public Service Commission of Kansas, Topeka, is requesting that a number of companies distributing natural gas in the state make a uniform rate of $2.50 for the first 5,000 cubic feet of gas. A conference is to be called shortly between the companies and the commission.

Glenwood, Iowa, Being Piped for Gas by Missouri Valley P. L. Co.

The franchise formerly owned by United Service Co. at Glenwood, Iowa, has been transferred to the Missouri Valley Pipe Line Co. Work of piping the town for gas has been begun by the latter company. Service will come from the company's major system near the town.

"Natural" Comes to Montana Centers Through 223-Mile, 20-Inch Line

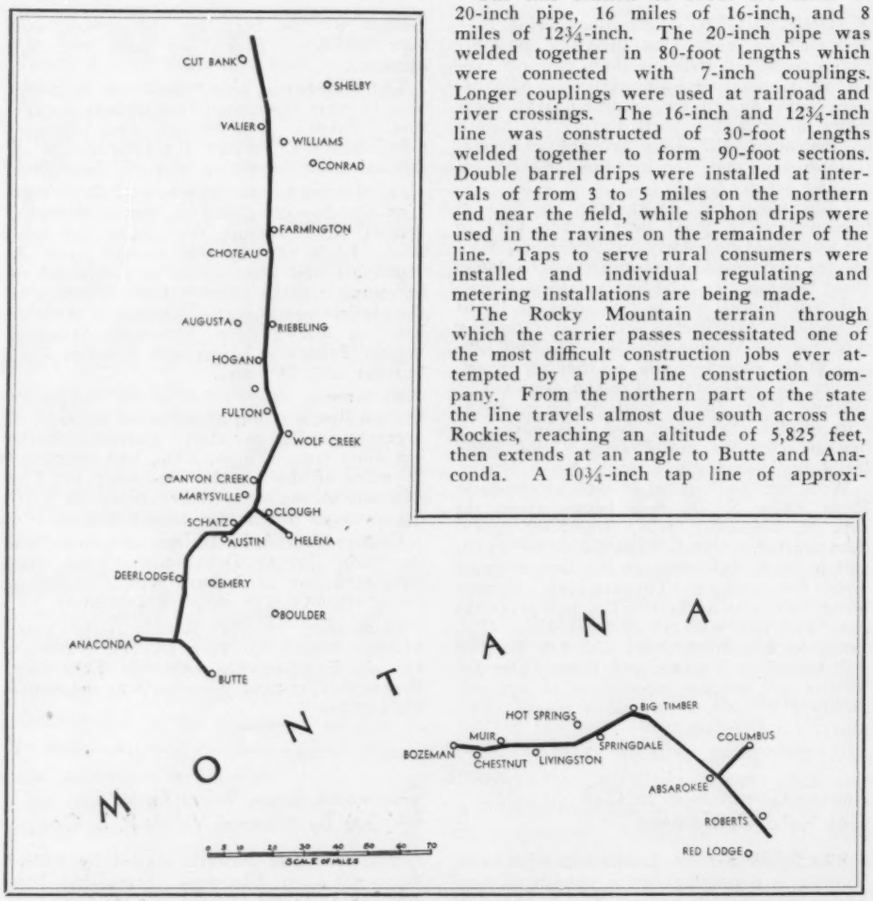
ADDITIONAL population centers of Montana came under the natural gas banner on September 7, when officials turned the control valve at the western outskirts of the city of Butte, sending gas into Montana Power Co.'s distribution system through the 223-mile, 20-inch line just completed for that company from the Cut Bank field by the Phoenix Utility Co. S. S. Nichols, general superintendent for Phoenix Utility, was in charge of the work. In addition to serving domestic consumers in Butte, Helena, Anaconda and Deer Lodge, the line will take on the load of Butte and Anaconda mining companies, notably that of the Anaconda Copper Co.

Forty miles of the 223 miles of line were constructed in practically solid rock. It is estimated that rock excavation amounted to approximately 115,000 cubic yards. There were three river crossings. A highway and telephone line was constructed along the entire length of the carrier, and more than 200 gates were needed where the line crosses ranch property. Approximately $11,000,000 was spent on the development, which will give Montana Power Co. distribution in 10 incorporated cities, 10 unincorporated towns and service connections to more than 200 ranches.

Construction view of the Marias River crossing on the Cut Bank-Butte line, showing separate 12-inch pipe lines being installed.

The line consists of about 199 miles of 20-inch pipe, 16 miles of 16-inch, and 8 miles of 12¾-inch. The 20-inch pipe was welded together in 80-foot lengths which were connected with 7-inch couplings. Longer couplings were used at railroad and river crossings. The 16-inch and 12¾-inch line was constructed of 30-foot lengths welded together to form 90-foot sections. Double barrel drips were installed at intervals of from 3 to 5 miles on the northern end near the field, while siphon drips were used in the ravines on the remainder of the line. Taps to serve rural consumers were installed and individual regulating and metering installations are being made.

The Rocky Mountain terrain through which the carrier passes necessitated one of the most difficult construction jobs ever attempted by a pipe line construction company. From the northern part of the state the line travels almost due south across the Rockies, reaching an altitude of 5,825 feet, then extends at an angle to Butte and Anaconda. A 10¾-inch tap line of approximately 15 miles was run from the main line to supply the towns of Helena and East Helena and a 4½-mile line serves Deer Lodge.



Sketch showing the recently completed 20-inch carrier from the Cut Bank field to Butte, Helena, Deer Lodge and Anaconda, and the southern system of the company, also recently placed in service. These two lines give Montana Power Co. a total of about 1,000 miles of gas transmission and distribution lines.

Through Wolf Creek Canyon and Mullans Pass it was found advisable to take the line over the hills, rather than through the natural passes. At Sheepnose Canyon, where the incline is greater than a 45-degree angle, and depth of the canyon is about 600 feet, with a span of 1000 feet, the line was welded into two sections of approximately 1,000 feet on top of the hills on either side and lowered into place and connected at the bottom.

There were three rivers crossed by the line, and one river crossing was a multiple line consisting of three 12-inch lines, solid-welded and tied into headers on each side. Other river crossings were solid-welded and buried with a minimum of three feet cover on the bottom of the stream.

Considerable alkali was encountered in some locations, and where this condition was met a field coat of primer was used, two coats of enamel and the pipe was wrapped with felt.

The contract for construction of the main line was let by Phoenix Utility Co. to Winston Bros., Minneapolis, who in turn sub-let a portion to Bechtel Kaiser Co., Ltd., of San Francisco, Calif. Work was completed on the 223 miles in 75 days.

Construction of additions to the distribution systems in Butte and Helena, and of new systems for Deer Lodge and Anaconda was carried on simultaneously with the transmission line construction. The usual preparations for natural gas service were made, and odorizing systems were installed. Butte and Helena's systems were changed from low- to high-pressure.

Montana Power Co., headquartered at Butte, now operates nearly 1,000 miles of gas transmission lines, including the Dry Creek-Bozeman 120-mile, 10-inch carrier recently placed in service.

Montana, with its long heating season of approximately 8,000 degree days, gives natural gas service a warm welcome at the beginning of the winter. Montana Power Co. is carrying on special merchandising work, conducting cooking schools in its territory and instructing housewives in the use of appliances in territory pioneered for gas service.

Rate Hearing Recessed Until October 1 For Lone Star

The Oklahoma Corporation Commission's hearing on gas rates charged in Oklahoma towns by the Lone Star Gas Co., and the Community Natural Gas Co. of Dallas, Texas, was recessed on September 17 until October 1. In an effort to force a reduction of gas rates Governor Murray filed suit in the district court at Waurika, Okla., asking for appointment of a receiver, and cancellation of charters, licenses and franchises of the corporation and its subsidiaries, including the Meridian Gas Co. and the Guthrie Gas Service Co. John W. Hoffman of Oklahoma City was appointed temporary receiver but did not take charge of the properties as the suit is a technical one only.

C. R. Smith Now Manager for Southwest Gas Co. at Cuero

Southwest Gas Co., headquartered at Shreveport, La., announces the appointment of C. R. Smith, formerly of Gonzales, Texas, as manager of its Cuero, Texas, office. Mr. Smith succeeds T. Lowrance.

John H. Hunt, Purchasing Agent for P. G. and E. Dies Sept. 13

PACIFIC GAS AND ELECTRIC CO. announces with deep regret the passing of John Hosford Hunt, purchasing agent, who succumbed to a heart attack while swimming in Bolinas Bay, on the coast of Merin County, Calif., Sunday, September 13.

Mr. Hunt was a native of Massachusetts, born March 19, 1868. At a very early age he came with his parents to California and settled in San Francisco, where he received his education in the public schools. At 15 years of age he entered the employ of the Sutter Street Railway Co. where he remained for 20 years, advancing eventually to the post of assistant secretary. In 1903 he became assistant purchasing agent of the United Railways and two years later accepted a similar position with the San Francisco Gas and Electric Co. and in the following year, when the local corporation became merged in the Pacific Gas and Electric Co., he became purchasing agent of the new concern, retaining that position until the day of his death.

In 1895 Mr. Hunt married Miss Olive E. Cutler, of San Francisco, who survives him. There are two children, John C. Hunt, employed in the auditing department of the Pacific Gas and Electric Co., and Mrs. G. L. Richardson.

Skelly Oil Co. Sells Interest in Texas-to-Chicago Carrier

Skelly Oil Co. is reported to have recently announced the sale of its interest in the Texas-to-Chicago gas transmission line to the Natural Gas Co. of America, operating organization. According to the report Phillips Petroleum Co. sold its interest in the line to the Texas Co. for approximately $5,500,000, and the purchase price paid by the Natural Gas Co. of America for Skelly's interest is believed to be about the same amount. It is reported that Standard Oil Co. of New Jersey has also sold part of its interest to the Southwestern Development Co., a subsidiary of Prairie Oil and Gas Co.

Texas Gas Rates to Form Basis of Investigation by Commission

Investigation of rates charged by Texas utilities for gas service is under consideration by the Texas Railroad Commission. L. B. Denning, president of the Lone Star Gas Co., has informed the commission that it will have the full cooperation in making such an investigation, believing that the inquiry will be beneficial both to the public and the natural gas industry.

Gas-Ice Corp. to Develop Carbon Dioxide in Washington

The Gas-Ice Corp., Seattle, has been organized by R. B. Newbern, president of the Northwestern Natural Gas Co., and associates, to develop the carbon dioxide holdings of the Klickitat Mineral Springs Co. The Gas-Ice Corp. expects to spend about $100,000 in the further development of a project in which $200,000 has already been expended.

Missouri Edison Co. Serving Natural at Louisiana, Mo.

Natural gas service was inaugurated at Louisiana, Mo., on August 31, through Missouri Edison Co. The distribution system which has been serving manufactured gas to the town has been rebuilt at a cost of $25,000.

AT RIGHT:

Exterior of Southern Counties new district office at Pomona, Calif. The building is of white stucco with black tile trim.

Pomona District Office Opened Sept. 16

OPENING of Southern Counties Gas Co.'s new Pomona District office took place on September 16, when open house was held for the public. On September 15 a dinner was held, to which guests were invited for a preview of the new structure. Following the dinner company executives and representative civic leaders took part in the evening's program. F. H. Bivens, vice-president of the company, acted as toastmaster, introducing the speakers. Mr. Bivens was the first manager of the Pomona territory for the company. F. H. Wade, president of the company, welcomed the guests and an opening greeting was given by Charles G. Spencer, manager of the Pomona district. LeRoy M. Edwards, general counsel for the company, spoke on the work being done in Southern Counties territory to advance the return of business prosperity. A short talk was offered by Mayor Charles G. McKey, followed by other civic leaders.

The new building is of white stucco with black tile, incorporating the modern style of architecture with a set-back second story. The interior of the structure is attractively finished in cream and tan. A main lobby runs the entire width of the building, extending back 32 feet. This space is utilized for the display of gas appliances, a portion of the east side being given over to a large fireplace with easy chairs for customers. Beyond the lobby is located the counter for customer-company business transactions, while offices of the manager and commercial representative are located on the east side.

On the second floor is an auditorium with a seating capacity of 200, where home service activities will be held. Local non-partisan organizations are invited to use the auditorium without charge. There is also a model kitchen in charge of Miss Morna Wagstaff, home service director, who will conduct regular cooking schools for women of the Pomona Valley.

On Monday, September 14, the Pomona Progress Bulletin devoted its entire second section to a review of the company's activities in the district, describing the new building and the work which the company intends to carry on.

Manufacturers' Section Annual Sessions

THE Annual Meeting of the Manufacturers' Section of the American Gas Association, held in Detroit, Mich., on September 17 and 18 was given over in part to discussion of a program for more aggressive development of the sale of gas appliances through gas company manufacturer and dealer cooperation. Both manufacturers of gas appliances and utility representatives expressed their willingness to join forces in this movement.

Sessions were called to order in the Blue Room of the Book-Cadillac Hotel at 10 A.M. on September 17, with Col. E. S. Dickey, manager, Maryland Meter Works, Baltimore, Md., acting as chairman. Following the usual amenities of the occasion, C. W. Berghorn, secretary of the Section, gave his report, followed by a review of the year's activities by Philip O. Deitsch, manager of group activities. Clifford E. Paige, president of the American Gas Association, gave an interesting talk on "The Association and the Appliance Manufacturer."

"The Development of Association Activities" was discussed by Alexander Forward, managing director of the A.G.A.

R. W. Gallagher, vice-president of the Association, spoke on "The Co-ordination of Our Industry as a Whole."

"Where to Now?" was the subject chosen by Dr. Virgil Jordan, economist of McGraw-Hill Publishing Co.

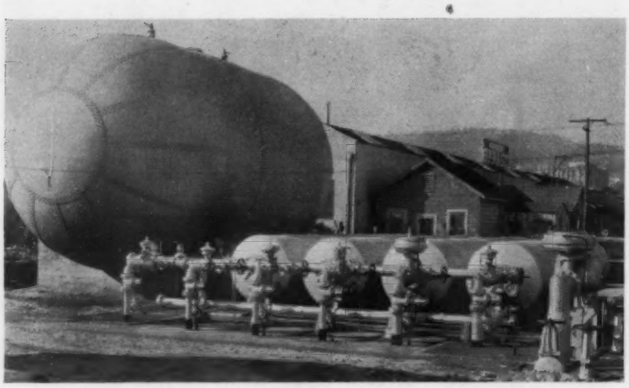
The subject of gas appliance sales was discussed in two addresses, one entitled "How Can We Assist the Dealer in the Merchandising of Appliances?" by Herbert Tappan, general manager of the Glenwood Range Co., Taunton, Mass. The second was "The Utility Financing of Dealer Sales," by E. R. Acker, general commercial manager, Central Hudson Gas & Electric Co., Poughkeepsie, N. Y.

Paul Ryan, chief statistician for the American Gas Association, spoke on "Past, Present and Future of A.G.A. Statistics."

At the luncheon meeting September 17, H. Leigh Whitelaw, vice-president and general manager, American Gas Products Association, New York, gave an address on "An Analysis of Our New Organization."

September 18 was given over to division meetings, each division discussing its own particular problems. W. Frank Roberts, president of the Standard Gas Equipment Corp., Baltimore, Md., led the discussions of the Range Division; Hartley G. Walker, president of the Pittsburgh Water Heater Co., Pittsburgh, Pa., as chairman of the Water Heater Division, had charge, while George A. Humphrey, sales manager, General Gas Light Co., Kalamazoo, Mich., led the Space Heater Division.

Subjects in common in the deliberations of the three divisions were the report of the Cross Licensing of Patents Committee, the report of the Standards of Practice Committee and the report of the Safety Ordinance Committee.



AT LEFT:

Fig. 1. High pressure storage and remote control regulators at Pacific Gas and Electric Co's. distribution control station, Monterey, Calif.

Remote Control Station Design at Monterey, California

THE advent of natural gas into Monterey, Monterey County, California, was on December 26, 1929, and on this date the gas manufacturing plant was shut down, thus changing this plant to a distribution control station. This change from manufactured to natural gas required the installation of equipment that would be automatic, so in case of a failure in the transmisison line the load would be taken care of automatically.

Harry J. Smith

The plant was well equipped with low pressure and high pressure storage. The low pressure storage consisted of a 500,000,-cubic foot holder and a 100,000-cubic foot holder. The high pressure storage consisted of one holder 18 feet in diameter by 35 feet 6 inches in length, and four holders 4 feet 6 inches in diameter by 27 feet 8 inches in length. The high pressure storage capacity is 25,000 cubic feet from 10 to 50 pounds gauge.

This high pressure storage is used for the purpose of automatically delivering the gas to the distribution system in case of a failure in the transmission line. This storage will give the operator sufficient time for the starting of the compressor for compressing the gas from the low pressure storage to the high pressure storage. The low pressure holders have a capacity of 600,000 cubic feet of gas, which will take care of the demand for about a day.

On the incoming transmission line a regulator steps the pressure down to 50 pounds gauge and at this pressure supplies the gas to the manifold header for the distribution system and to the surplus gas consumers.

Figs. 1 and 2 show the automatic regulators, remote control board and orifice meter gauges for the automatic control of this station. The gas delivered to the station is reduced from 50 pounds gauge pressure to 25 pounds gauge pressure through a regulator to the manifold header. Ahead of the regulator feeding the manifold header, a check valve is installed so as to prevent the gas from flowing back in case of a failure in the transmission line.

A regulator is also installed on the outlet of the high pressure storage and is set for 15 pounds gauge outlet, so that in case of a failure in the transmission line, this regulator automatically opens at a point just below 15 pounds, making it possible to feed the distribution system from the high pressure storage without an attendant for a short period of time.

There are three regulators for the high pressure feeders to the distribution system: Pacific Grove, 10 pounds gauge; Carmel, 5 pounds gauge; and Monterey Rural at 1 pound gauge.

There are two low pressure regulators, one for reducing the pressure from the low pressure storage to the distribution system to 8 inches of pressure water column; the other low pressure regulator is installed in the high pressure manifold, so that gas can be delivered to the low pressure system from the high pressure storage, and this is merely a standby to be used only in case of a failure to the low pressure regulator on the low pressure storage.

All of the regulators are remote control from the office, which makes it unnecessary for the operator to leave the office at any time, unless under extreme emergency.

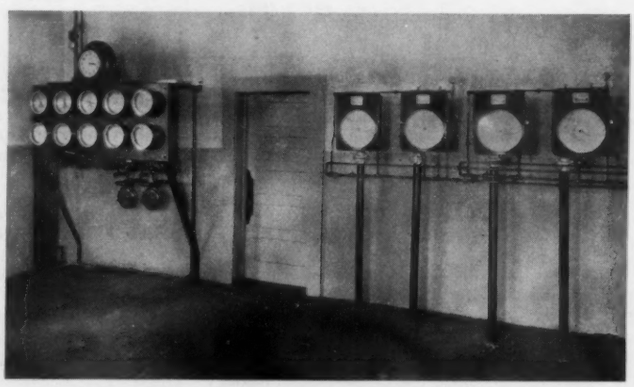
Indicating and recording gauges record the pressures on the incoming gas from the transmission line, the gas delivered to the manifold header and the high pressure storage. The indicating gauges are equipped with an alarm system set for high and low pressures, so that in case the pressure should rise or drop to the danger points, an electric bell rings in the office and an electric horn blows in the yard, thus giving the operator warning that the pressures have reached an alarming stage.

The high pressure to Monterey Rural, Pacific Grove, Carmel, and the low pressure to the Monterey low pressure system are all of the recording type.

The pilot control regulator is a rather unique system for automatic regulation. The system that is used in this arrangement is to install a high pressure line that is connected at a point ahead of the incoming regulator and to a manifold header at the control board. The inlets of the pilot control regulators are connected to this header so that the desired pressure can be maintained to the top of the diaphragms of the regulators in order to maintain the delivery pressure to the distribution system. On the outlet of the pilot control regulators a bleeder line is installed with a needle valve. This needle valve is used to bleed off a small percentage of the gas so as to keep the pilot control regulators active and also to keep the pressure constant on top of the diaphragm. The gas that is bled off through these needle valves from the high pressure regulators is delivered to a manifold header and this gas is returned to the low pressure system, avoiding any wastage of gas.

AT RIGHT:

Fig. 2. Remote control board, gauges and orifice meters. Gas delivered to the station is reduced from 50 pounds to 25 pounds gauge pressure.



The low pressure regulator has a high pressure pilot control regulator for reducing the high pressure from the high pressure manifold to 5 pounds gauge, and in series with this high pressure pilot control regulator is a house-type regulator for reducing the pressure to the top of the diaphragm of the low pressure regulator. This is necessary as the high pressure regulator cannot be used to give regulation on inches of pressure water column. On the outlet a bleeder line is installed with a needle valve for bleeding off a small amount of gas to keep the regulator active. On account of the inches of pressure water column, it is impossible to deliver this back to the low pressure system, so this is carried in a separate line to some point outside of the building, so that it can escape into the atmosphere.

Previous to this system, weights were used to regulate the pressures to the distribution system, which gave very irregular charts, but with the pilot control, the charts are free from irregularities and during periods when no changes are made in the pressures to the distribution system, the pen charts a perfect circle, irrespective of the location of the regulator to the control board, the longest run of which is 250 feet, and since this system has been installed, there has been no difficulty with controlling pressures to suit the operating requirements.

The 500,000 cubic foot holder is equipped with an automatic shut-off, as shown in Fig. 3. This automatic shut-off is rather a unique device, designed by two employees of the Pacific Gas and Electric Co. It consists of a flat bar with a quarter twist, which is suspended from the first row of girders with roller bearings top and bottom and by slipping through a guide on the first gooseneck, prevents the gas from entering when the holder is approximately 6 feet from being fully inflated. This device does not allow gas to enter until the holder recedes about 10 feet, when the valve opens, allowing gas again to enter the holder, thus giving automatic regulation to the holder at all times, as long as there is gas in the transmission line.

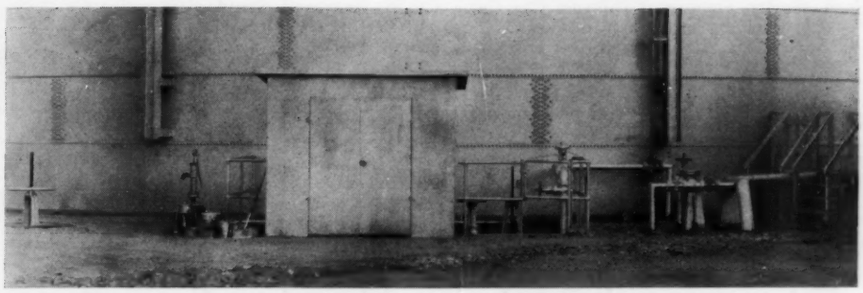


Fig. 3. Automatic low pressure holder shut-off.

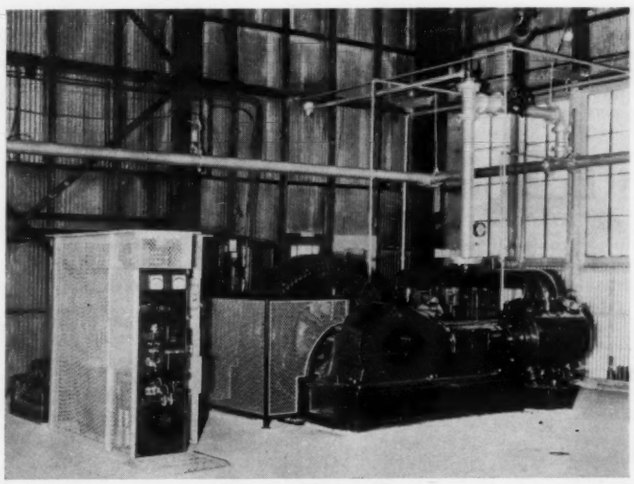
In case of a failure to the transmission line, a back pressure regulator has been installed after the plug valve, for filling the holder. If the pressure in the transmission line drops to 25 pounds, the back pressure regulator automatically cuts off the supply of gas to the low pressure holder, thus leaving the gas in the transmission line for the distribution system.

Fig. 4 shows the installation of a synchronous motor-driven duplex gas compressor, having an actual hourly delivery of 85,500 cu. ft. at 60 pounds gauge pressure. The cylinders are 17 inches in diameter with 16-inch stroke. The compressor has a speed of 225 revolutions per minute. The synchronous motor is a 200 k.v.a., 4150 volts, 3 phase, 60 cycle. The switchboard for this cynchronous motor is of the automatic type and the unit is started merely by pressing a button on the switchboard.

The compressor is of the automatic suction unloading type so that when the predetermined discharge pressure is reached, the suction valves are held open, thereby allowing the gas to return through the suction valves, allowing the compressor to idle without doing any work, and when the pressure recedes approximately 4 pounds, the suction valves are automatically closed, thereby compressing the gas up to the predetermined discharge pressure before unloading.

The discharge piping from the compressor is so arranged that gas can be delivered to the high pressure storage or to the manifold header.

Since the installation of this remote control system for controlling pressures has been a perfect success from the start, the company has just completed a remote control system at the San Rafael gas plant and is now constructing one at the San Jose gas plant.



AT LEFT:

Fig. 4. Synchronous motor driven gas compressor having an hourly delivery of 85,000 cubic feet at 60 pounds gauge pressure

S. C. M. A. Committeemens' Pep Meeting

ON September 17 the Southern California Meter Association held its "Committeemen's Pep Meeting," an annual event which has for its purpose outlining a program of work for committee groups. The meeting took the form of a "Dutch lunch" at the Los Angeles Gas and Electric Corp. plant, 553 Ramirez St., Los Angeles. Thirty-six were present, and reported a highly enjoyable time, with considerable progress made in shaping up the committee projects for the year ahead.

E. Lorenz, chairman of the Association's entertainment committee, with L. P. W. Des Brisay and W. J. Kennedy, handled preparations for the meeting.

Following a brief general discussion presided over by Mr. Des Brisay, vice-president of the S.C.M.A., in the absence of P. W. Hill, president, the meeting separated into committee groups. The list of standing committees named for the 1931-1932 Association years is as follows:

Program

H. M. Dwight, Southern California Gas Co., Chairman.
J. R. McLaughlin, Southern Counties Gas Co.
M. J. Cereghino, Los Angeles Gas and Electric Corp.
W. L. Cowan, Union Oil Co.
J. A. Swindle, General Petroleum Corp.
A. G. Lindell, Industrial Fuel Supply Co.
F. Stevens, Gilmore Gasoline Co.

Standards

M. W. Adcock, Union Oil Co., Chairman.
M. Levering, Southern California Gas Co.
Edgar Valby, Richfield Oil Co.
T. T. Gill, Union Oil Co.
Otto Goldkamp, San Diego Consolidated Gas and Electric Corp.
T. K. M. Smith, Industrial Fuel Supply Co.
L. E. Dolton, Gilmore Gasoline Co.

By-Laws

L. Bonner, Standard Gasoline Co., Chairman.
B. Y. Varner, Southern California Gas Co.
W. Shellshear, Gilmore Gasoline Co.
R. N. Brown, Union Oil Co.

Entertainment

E. Lorenz, Southern California Gas Co., Chairman.
A. E. De Burn, Pacific Pipe & Supply Co.
G. H. Unkefer, Westcott & Greis, Inc.
M. R. Miller, Southern Counties Gas Co.
R. L. Cook, Southern California Gas Co.

Membership

W. A. Spencer, Southern Counties Gas Co., Chairman.

H. A. Hurley, Southern California Gas Co.
F. A. Miller, Southern Counties Gas Co.
W. J. Kennedy, Los Angeles Gas and Electric Corp.
C. W. Brockman, Union Oil Co.
J. C. Groenwegen, Shell Oil Co.
E. C. Spencer, Norwalk Co.
W. Canning, West Coast Refining Co.
T. G. McAlister, Texas Corp.
W. L. Crane, Geo. F. Getty Gasoline Co.
L. W. Amlinger, Union Oil Co.
G. M. Swanson, Southern Counties Gas Co.
E. Hedrick, Industrial Fuel Supply Co.
C. B. Heartwell, Standard Gasoline Co.
B. Parker, Gilmore Gasoline Co.
D. A. Stocks, Richfield Oil Co.

Publications

G. H. Finley, *Western Gas*, Chairman.
R. F. Angell, Union Oil Co.
W. J. Kennedy, Los Angeles Gas and Electric Corp.
W. L. Cowan, Union Oil Co.
B. G. Williams, Southern California Gas Co.
Edgar Wilde, Southern Counties Gas Co.

Dinner and Business Meeting Sept. 24

A NEW dinner meeting arrangement was used by the Southern California Meter Association for the September 24 meeting, the dinner being held at 6:30 p.m. at the Pig'n Whistle cafe, 7th and Flower Sts., Los Angeles, and the business meeting convening at 8:00, in the L. A. Gas and Electric Corp. Auditorium, 8th and Flower.

A paper entitled "Recording Instruments in Gas Measurement", prepared by W. C. Begeebing, assistant chief engineer of the C. J. Tagliabue Mfg. Co. of Brooklyn, N. Y., was read by A. L. Pickard of C. F. Braun & Co. Large scale diagrams were used with the paper, and one of the new-type Tagliabue orifice meter gauges was also used to illustrate the discussion.

G. Harry Miller of the Mathews Paint Co. gave a discussion on "Paint as a Protective Coating for Meter Installations", treating in considerable detail of types of paint and paint application for various uses.

L. P. W. Des Brisay, vice-president of the S.C.M.A., presided over the September meeting, with H. M. Dwight, head of the program committee directing discussions. W. A. Spencer, chairman of the membership committee, reported six new members for the past month.

A. E. De Burn announced the S.C.M.A. monthly golf winners for the August play as follows: T. K. M. Smith, Industrial Fuel Supply Co., first place; W. J. Schomberg and A. F. Midas, of the Pacific Pipe & Supply Co., second and third, respectively.

Meterman's Handbook in Second Edition

THE first edition of the S.C.M.A. Meterman's Handbook, issued a few weeks ago, was completely sold out shortly after its announcement. A second edition has now been assembled, and R. F. Angell, in charge of this S.C.M.A. project, announces that copies are now available to fill new orders at once. Those whose previous orders have been unfilled to date, due to the lack of copies, may expect to receive their Handbooks within a few days.

The Meterman's Handbook is of convenient pocket size, loose leaf in form, with sheets assembled in a stiff canvas cover, conveniently indexed. Chapter groups of the material are divided into the following heads: Tables, air and gas, liquids, steam, orifice plates, pipe fittings, miscellaneous.

Material for the handbook comes from papers prepared for the Association, S.M.C.A. data sheets and from other authoritative sources. All charts and tables essential in computation of air, gas, steam and liquid flow through orifices, besides many conversion tables and correction charts, are included. A number of companies are supplying each of their metermen with a copy of the handbook.

The enthusiastic reception of the first edition of the Handbook indicates that it is filling a long felt need. Copies may be ordered at $2.00 each, postpaid, and orders should be addressed to the Southern California Meter Association, Box 1100, Station C, Los Angeles, Calif.

Paper on "Experiments on the Metering of Large Volumes of Air"

The Bureau of Standards of the United States Department of Commerce recently brought out in pamphlet form a paper on "Experiments on the Metering of Large Volumes of Air," by Howard S. Bean, M. E. Benesch and Edgar Buckingham. The paper originally appeared in the Bureau of Standards' Journal of Research, Vol. 7, July, 1931.

Two-Month Completion Possible for S. C. M. A. Course

L. L. Southerland, educational director for the Southern California Meter Association, announces that a supply of copies is now in hand for each of the 20 lessons comprising the Association's extension course in gas measurement, making it possible to conduct the course for new students as rapidly as the lesson assignments are handled by the student. It is possible to complete the course in as brief a period as two months, if concentrated work is done by the student, according to Mr. Southerland. Inquiries from any regarding the course should be addressed to the Southern California Meter Association, Box 1100, Station C, Los Angeles, Calif.—attention of the Educational Committee. Cost of the course is $18 to non-members of the S.C.M.A., or $17 to members.

Leonard F. Carter on West Coast Visit

Leonard F. Carter, assistant gas engineer for the Colorado Interstate Gas Co., with headquarters at Colorado Springs, Colo., visited on the Pacific Coast during September. He attended the September 17 Committeemen's Pep Meeting of the Southern California Meter Association, of which he is a member. During his stay in Southern California Mr. Carter inspected a number of measurement stations and other gas service facilities.

S. C. M. A. Forum of Experience

"Knowledge is built upon the experience of others."

DUE to the large number of questions on practical measurement and control topics which the Southern California Meter Association has received from readers of these pages, the Association has arranged to carry on a "question and answer" department in *Western Gas*—this department to be known as "The S.C.M.A. Forum of Experience." The Association's Question and Answer Committee, chairmanned by H. E. Thompson, will propound new questions each month, and supply answers the month following from information submitted to the department. Initials only, will be published with questions and answers. Readers of *Western Gas* are urged to take advantage of the services of the department, sending in their questions, and contributing helpful answers whenever possible. Communications should be addressed to

S.C.M.A. "Q. and A." Committee,
Box 1100, Sta. C, Los Angeles, Calif.

This Month's Questions

Q. 101. How eccentrically may an orifice be located in a meter run before the error is 1 per cent?—R.F.A. (Editorial note:—A very moot question that causes both worry and expense in practical metering.)

Q. 102. Is chromium or cadmium plating of orifice plates or thermometer wells in gas lines worth while?—W.L.B.

Q. 103. How many gas charts may be computed per man per day?—B.C.M., Los Angeles, Calif. (This isn't just a matter of opinion. Send in your best records!)

Q. 104. Is it feasible to measure pulsating steam flow to reciprocating pumps by orifice meter?—P.F. (You pulsating-gas-flow experts should find this one easy. Give reasons for your answer; they may be more valuable than the bare answer itself.)

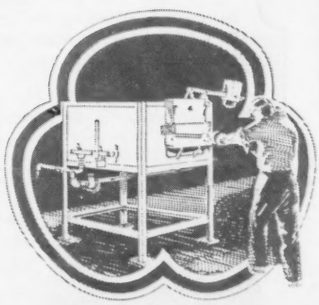
Previous Questions Answered

A. 96. Recorder ink which gums in hot weather should be diluted with 50 per cent glycerine.—H.F.H. (Ed. note: A chemist tells us this.)

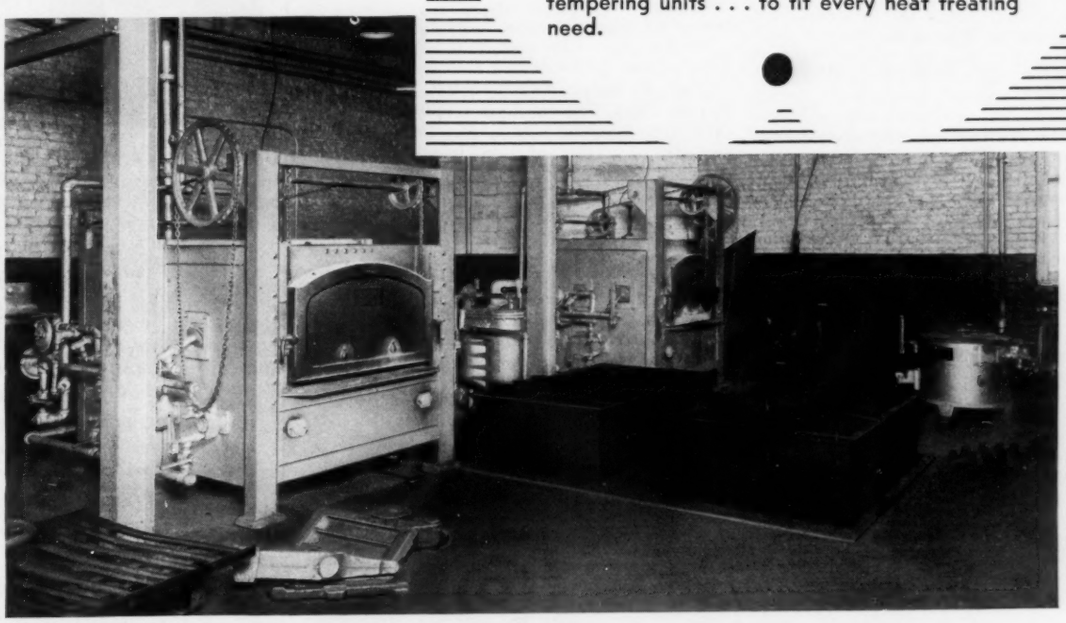
A. 97. The square root planimeter may be accepted as 100 per cent accurate on single-record chart.—R.F. (Read all about this in *Western Gas*, December, 1929.)

A. 98. The reason for the square root sign as part of the orifice meter formula arises in this manner: The formula states volumetric quantity as cross-sectional area of stream multiplied by the stream velocity, and states the velocity in terms of the "head" of a similar fluid that would produce such a velocity. The relation of head to velocity is $V = \sqrt{2gH}$, thus introducing the "radical" as a fundamental part of the formula.—H.E.T. (A very hard question to answer briefly. See *Western Gas*, August, 1928, for complete explanation. There will be an S.C.M.A. Data Sheet on this, some day.)

ACCURATE...RAPID ...UNIFORM *Heating* *with* SC RATED FURNACES



WHEN you place an SC Rated Furnace in a customer's plant you can be satisfied—sure—it will do the job intended economically—efficiently—without operating and production difficulties. SC Rated Furnaces are fired with SC Inspirator Burners. Heating is rapid and uniform—with single valve control and automatically maintained furnace atmosphere. The photograph below illustrates two large oven furnaces at the Sivyer Steel Casting Co., Milwaukee, Wisconsin. These furnaces are giving excellent results in the annealing, hardening, and drawing of steel and alloy castings. SC Rated Furnaces are available in large and small oven types, as well as high temperature furnaces, forge, rivet heating, pot hardening, and oil tempering units . . . to fit every heat treating need.



OPERATED BY HENRY L. DOHERTY & COMPANY

Surface Combustion

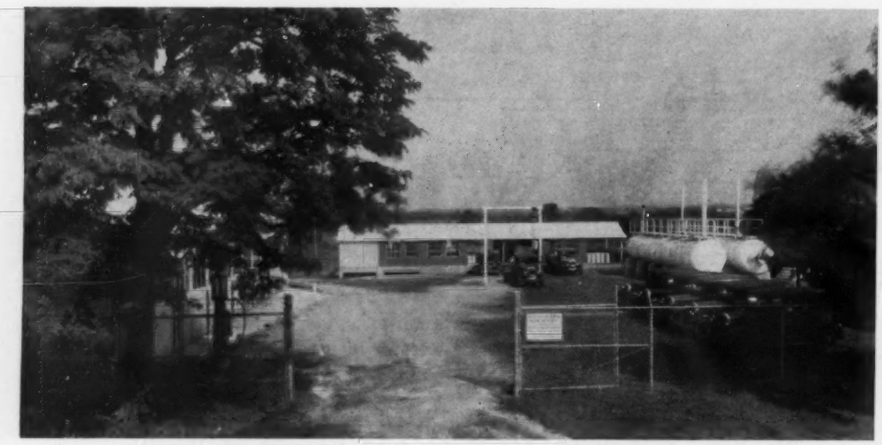
SURFACE COMBUSTION CORPORATION
TOLEDO, OHIO.

SALES AND ENGINEERING SERVICE
IN PRINCIPAL CITIES

Western Distributors—Natural Gas Equipment, Inc.—Los Angeles—San Francisco

BUTANE - PROPANE NEWS

Covering Liquefied Petroleum Gas Service



AT LEFT

One of several bulk stations operated by Philfuels Co. in propane distribution. The station illustrated is located near Baltimore, Md.

The Distribution of Propane As "Bottled Gas"

By H. EMERSON THOMAS
Eastern Representative, Philfuels Company

FACTS on "bottled gas" distribution, here assembled by Mr. Thomas for the benefit of "Butane-Propane News" department readers, make this discussion the most valuable published on the subject to date. The author has not been satisfied to deal with surface aspects of propane distribution. He goes deeply into the economics of this expanding service, and gives exceedingly pertinent information on investments per consumer, price schedules, direct and indirect costs, revenues and profits. His tabular presentation of these data will be of lasting reference value to the industry. New developments in distributing practice—the part played by the bulk distributing station—effect of declining prices upon widening of market—these and other equally significant considerations are discussed authoritatively.—EDITOR.

H. E. Thomas

AT present the "bottled gas" division of the liquefied petroleum gas industry is having a rapid growth and in the past two years has attracted many new organizations and much new capital. In spite of these new additions it has, however, in many instances been poorly organized and under-capitalized.

Beginnings of Industry

The so-called "bottled gas" industry started in the days of "Blaugas," which was developed in Germany by an inventor, Hermann Blau, and introduced into the United States around 1904 by Mr. Blau. The process of producing Blaugas was to crack oil in retorts at atmospheric pressure of about 1,100° F. The resulting gases were treated by a compression process which recovered them by partial liquefaction, after which the product was charged in cylinders under pressures exceeding 1000 pounds, and distributed for domestic and semi-commercial work.

Blaugas, however, proved expensive to produce, and with the availability of large supplies of liquefied petroleum gases, the existing Blaugas companies shut down the cracking plants and commenced using commercial propane (C_3H_8). Previous to the use of propane in quantities there were organized several companies which marketed the so-called "wet gases." These are primarily propane and butane mixtures (in cases, pentane) and require vaporization units for their use. The main companies now in this field are Protane Corp., Universal Bottled Gas Corp., Rockgas Corp., Hi-Heat Co. and Vapyre Corp. In the past few years, however, this type of system has been greatly exceeded, in sales of new installations, by the "dry gas" fuel (propane).

It was not until about 1924 that the industry gained material prominence, and not until 1928 that its present rapid stride commenced. The first large national distributor of propane, the main hydrocarbon constituent distributed as a bottled gas, was the Carbide and Carbon Chemicals Corp., which sold its product under the trade name "Pyrofax." This organization has offered its product nationally through a large warehousing and dealer organization and also through mail order houses. Later such organizations as the Fuelite Natural Gas Corp., Nugas Corp. and other smaller groups entered this field. They were followed by such oil companies as the Skelly Oil Co. and Shell Oil Co. in the middle west; Standard Oil Co. of California, Imperial Gas Co. and Shell Petroleum Co. on the Pacific Coast, and Philfuels Co. (Phillips Petroleum Co.) in the east and north. The Northwestern Blaugas Co. and the Omaha Blaugas Co. were still active in the middle west, but had substituted propane for Blaugas. These companies all utilized the conventional two-drum system. The Standard Oil Co. of New Jersey has for years sold quantities of propane for cutting, but has not entered the actual retail merchandising to domestic users.

The two-drum system consists of a rectangular cabinet approximately 16x35x59 inches, holding two cylinders varying in propane capacity from 50 to 100 pounds. Copper "pigtails" connect the cylinders to a regulator bolted on the back of the cabinet. The regulator is connected through a mercury seal safety cup to the house piping system and delivers gas at approximately 11 inches H_2O. The cylinders contain liquid propane, which boils at about −44° F.; thus, vaporization takes place in the cylinders even under extreme winter weather conditions. Care must be taken, however, on exceptionally large loads not to take the gas from the cylinders too rapidly or the refrigeration caused by the latent heat of vaporization will lower the temperature of the liquid

propane with a decline in vapor pressure, and possible difficulty in withdrawing the gas requirements. This fuel has a calorific value of approximately 91,400 B.t.u. per gallon, or 21,650 B.t.u. per pound, and the vapor has about 2550 B.t.u. per cubic foot.

One-Drum Service

In the spring of 1928 Philfuels Co., a subsidiary of Phillips Petroleum Co., was organized and entered the liquefied petroleum gas industry with several departures from the established methods and systems then in use. The first change was the creation of the "one-drum system," whereby in the average domestic installation one cylinder was installed, having approximately two months supply of fuel. On a regular schedule a tank truck refills the cylinder and the customer is billed monthly for the amount of gas consumed. Under this system Philfuels Co. accepts the responsibility of keeping a sufficient supply of gas on reserve in the equipment at the customer's, while under the "two-drum system" this responsibility falls on the customer. The Philfuels system, sold as "Philgas Service," gives an exact duplication of city gas service.

A radical change in set-up introduced with this novel system was the leasing of the equipment to the customer at a nominal installation charge rather than merchandising the equipment at large profits, as had been the past policy of the industry. The lower original cost to the consumer of $36.50, together with lower gas prices, brought "bottled gas" out of the wealthy home owners class to a point within reach of a larger number of prospects beyond the gas mains. Sales results have proved this theory to be well founded. Since this lease idea was promulgated by Philfuels Co. practically all other prominent companies in the retail field have accepted it as a necessity for permanency. Philfuels Co. also set a retail step-rate schedule of prices starting at $.12 per pound and decreasing to as low as $.08 per pound for very large consumption. These prices are equivalent to average city gas at prices of from $2.50 to $1.75 per M cu. ft., taking into consideration the greater efficiency of properly built propane stoves. These prices are within reach of the average consumer, while the old price of $.18 per pound, equivalent to approximately $4.40 per M cu. ft. gas, was prohibitive in the average case.

Lower Prices Broaden Market

At the present time the retail price range of bottled gas runs from about $.14 to $.10 per pound. Operating experiences of various companies in the business show this range to allow a well functioning and efficient organization to make a reasonable, although not excessive, profit. In California prices are somewhat lower because of the close proximity to the producing fields.

Just as in most industries, the market has been greatly widened and the rate of sales greatly increased because of the lower costs to the consumer. Table No. 1 gives an idea of the growth of the industry since 1922. Up to 1927 the quantities in this table cover fuel consumed in the bottled gas phase of the liquefied petroleum gas industry; however, in the past four years the other branches of the industry, such as small town gas plants and industrial plants, have probably accounted for 40 to 50 per cent of the total. In spite of this fact it is noted that the rate of growth has been extremely rapid.

Distributing Economics

In fact, its development has been so rapid that many individuals have been attracted to the distributing business, although these individuals sometimes have neither the required capital nor the background for such development on a sound basis. There has been a tendency to lose sight of the fact that a distributor requires about 1,000 regular customers to make a profitable business, a point which is emphasized when we consider that the average customer uses approximately 400 pounds of fuel per year. In distributing fuel in 100-pound capacity cylinders this consumption means four deliveries of gas per year or one every three months' interval. This means 1,000 cylinder deliveries per quarter. The average daily deliveries for a 1½-ton truck number 25 cylinders, and thus only 40 days are needed to deliver three months' supply of fuel. The logical delivery system would be on a basis of a definite and regularly scheduled route where many deliveries could be made in a small area and from 50 to 75 deliveries being made per day instead of 25 per day. If such a schedule could be worked out the cost of distribution would be greatly reduced from what it is today. However, the customers sold to date by most companies are scattered over an area having a radius of approximately 30 to 40 miles, and the customers will need cylinders of fuel at various times, which necessitates covering the same territory and route several times per month. The industry undoubtedly some time will reach a concentration many times that obtained at present. Philfuels Co. has thus far accomplished a concentration of the largest known number of customers in restricted territories.

The Philfuels "one-drum" system has brought economy into customer delivery. Some of the two-drum distributors have changed from the old system of waiting for the customer to notify them of the emptying of one cylinder and that the reserve cylinder has been turned on, by routing the delivery truck on a regular schedule. In this way it is at times necessary to remove a partially empty cylinder and replace it with a full one. This method has been little used today in two-drum work; however, it will undoubtedly be more generally used within a relatively short time. This development is the result of a tendency on the part of the consumer to put off the ordering of the new cylinder as long as possible, so as to delay the date of shipment, or of the customers' forgetting to order full replacement tank. Such tactics cause a great many "out-of-gas" calls from customers for a "cylinder of gas in time to finish dinner," with the result that the dealer or distributor is blamed for his inability to give better service.

TABLE NO. 1. MARKETED PRODUCTION OF LIQUEFIED PETROLEUM GASES.

Year	Gallons
1922	222,841
1923	276,863
1924	376,488
1925	403,674
1926	465,085
1927	1,091,005
1928	4,522,899
1929	9,925,698
1930	18,017,347

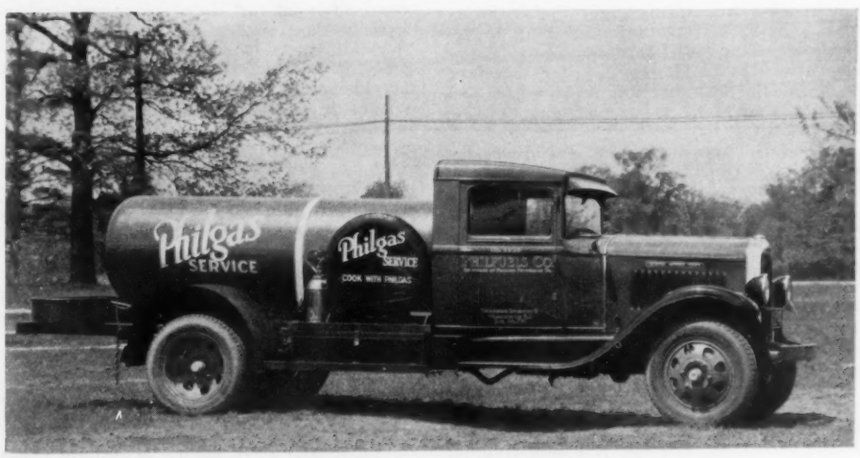
Bulk Distributing Stations

Although there are upward of 50 distributors of "bottled gas" in the United States today, only about a half dozen manufacture the fuel which they distribute. Two or three producers have bulk stations from which to supply their wholesale distributors with their propane requirements, while others fill cylinders at their producing plants only. As the manufacturing points are usually situated in sparsely settled or natural gas territories, their geographic location causes a distinct economic loss in high transportation costs. This point is accentuated when we realize that the per pound cost of transporting propane in cylinders is approximately four times greater than in tank cars. In such instances the ultimate consumer either pays more for the fuel or the distributor and dealer work on a smaller gross profit. Because of competitive prices the latter is usually true.

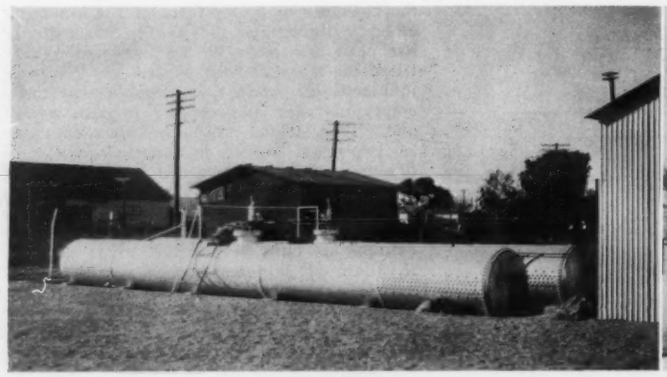
Philfuels Co. has unlimited bulk station facilities in the northwest and middle northern parts of the country. Fifteen stations are established in the north central and northeastern part of United States, and located near the larger cities in that portion of this country lying between Madison, Wis., Washington, D. C., and Boston, Mass. The territory served comprises the highly concentrated areas where "bottled gas" has been most successfully marketed. The strategic location of these stations makes long, costly rail or truck hauls with cylinders unnecessary and makes quick service available to the independent distributor.

The cylinder most frequently encountered

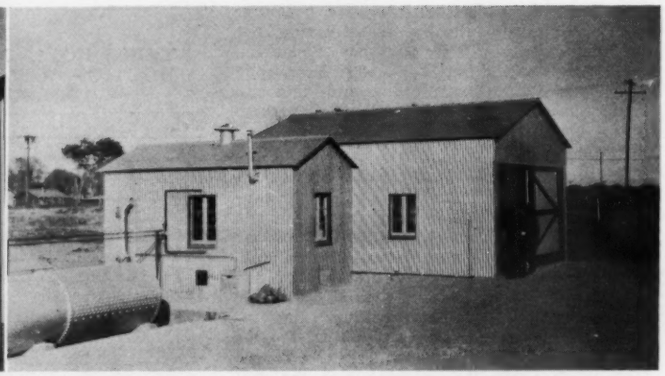
(Continued on Page 54)



Tank truck used by Philfuels Co. for distribution to individual homes on the one-drum plan.



Liquid butane storage tanks at the Lancaster plant, having a capacity of 3,800 gallons each.



Warehouse and garage on right; generator house on the left, in the Lancaster butane plant.

A Year's Experience in Undiluted Butane-Propane Service to Mojave Desert Communities

By LEE HOLTZ

General Superintendent, Manufacture and Distribution, Southern California Gas Company

SINCE the introduction of undiluted butane-propane gas distribution at Moorpark, Calif., by the Southern Counties Gas Co. in the spring of 1930, 10 additional towns or communities on the Pacific Coast are to date being successfully served in the same manner. Three of these towns, namely, Palmdale, Lancaster and Mojave, with a combined population of 3,600 people, are being satisfactorily served by the Southern California Gas Co. and the plants have been operated approximately one year without a single moment's interruption to the customers —further proving the practicability of undiluted liquid petroleum gas manufacture, distribution and utilization.

It should be said at this point, however, that immediate success might not have been had at these three towns had it not been for the benefit derived from the pioneering efforts of the Southern Counties Gas Co. and the Philfuels Co. These two companies without question deserve much credit in advancing the liquid gas idea.

The suggestion was made to the writer that perhaps the year's experience gained in operation at these three towns might disclose information of value, and add something to the future development of this comparatively new enterprise. It would seem in order, therefore, to begin the story at the point when first thought was given to serving gas to these communities.

Palmdale, Lancaster and Mojave are located on the western edge of the Mojave Desert, the farthest point from Los Angeles being Mojave, a distance of 100 miles and somewhat remote from natural gas supply. Lancaster, the largest of the three towns, is located 9 miles from Palmdale and 26 miles from Mojave, and serves as the operating headquarters. The chief industry around Palmdale and Lancaster is agriculture. Mojave is a railroad town and a division point of the Southern Pacific and Santa Fe railroads. Climatic conditions are somewhat exereme, with atmospheric temperatures ranging from approximately zero during the winter months to 120° in July and August; yet the agricultural area produces some crop or other the year round due to the fact that extremely cold periods do not last for more than a few days at a time. These conditions of course have quite a bearing on liquid gas distribution, as will be developed later in this discussion.

Lee Holtz

Preliminary Study

After the decision was made by the company management to investigate the possibilities for gas distribution in this area, maps were obtained showing the layout of towns, and a street-by-street survey was made. Location of buildings, as to kind and size, was indicated on the maps, with comments as to the class of business to be expected and the number of electric services that could be seen. In addition to this a further study was made as to the number using electricity, as well as those that had service connections, but were not using electricity. A further study was made as to other types of fuel used, prices being paid and the approximate quantity used per year.

After the preliminary figures were brought in and it appeared advisable to continue with the study, the new business department proceeded to interview the people to obtain their reaction to gas service. While this action was in progress the engineering and construction departments were busily engaged in designing plants and in making distribution system layouts, estimating costs, etc. Consideration was given the use of straight vapor or undiluted gas vs. diluted or air-mix gas, along with the advantages and disadvantages of each for these particular types of communities.

In the final analysis the straight vapor principle was chosen for the following reasons:

(1) Low first cost.

(2) Simplicity of operation, there being no moving parts other than the movement of regulator and meter diaphragms.

(3) No plant attendant necessary, since generating equipment would be entirely automatic.

(4) No maintenance cost for standby equipment.

Under the heading of "disadvantages" came the following:

(1) Since it would be desirable to sell gas of a concentrated butane-propane mixture by the pound or therm, if possible, and not on the basis of 1000 cubic feet, it would require a separate system of billing to the customer and would introduce a foreign element into the accounting methods.

(2) In case of leaks the economic loss would be greater in serving approximately 3000 B.t.u. gas than it would be in serving 1000 or less B.t.u. gas.

(3) Should natural gas at a later date be extended into the territory, it would be necessary to readjust all appliances.

These disadvantages, however, were considered of minor importance, for in order to show a profit in serving these small and somewhat scattered communities, it would be absolutely necessary to keep down the investment as much as possible. The greater portion of the saving in investment would necessarily have to be made in the generating plant and equipment, for the cost of the distribution system would be the same in either case, the only difference being whether a low or high pressure system was to be used.

The low pressure system was chosen for the reason that the saving to be made by eliminating the use of house regulators more than offset the slightly lesser cost in smaller size mains. Furthermore, should a leak occur in the system the loss would not be so great.

Designing Distribution System

In planning the distribution system the pipe sizes were calculated on the delivery of 12-inch water pressure at the plant and not more than a 2½-inch drop during the peak hour demand at the farthest point in the system. Further consideration was also given to sections of the towns which, although vacant at present, would in the future probably develop.

In the two larger towns a 4-inch main runs from the plant to the business section, which is several blocks away. A 3-inch pipe line is then used at this point and on through the main arteries, which in turn supply gas to the residential sections through laterals of 2-inch pipe. Alleys are used wherever possible. In the smallest town only 3 and 2-inch lines are used. All pipe is steel, is welded and is made bottle tight after standing a 24-hour test at 60 pounds pressure.

All service pipes during the construction of these distribution systems were welded from the main to the stop cock at the meter connections. No fittings of any description were used to this point, except a 90° bend at the foot of the riser. All service connections, since the systems have been put into operation, have been made with welded tees with an opening at the top. The top of the tee is threaded and closed with a cap put on with litharge. This opening permits the use of a tapping machine. All underground valve shutoffs were of the lubricated plug cock type. On the main lines these cocks were placed at the ends of the distribution system at the street intersections on the property line to facilitate future main extensions.

Both iron and tin meter installations were made, using the 100-foot dials. All screw connections were doped with litharge.

Generating plant sites were chosen close to a railroad spur—approximately 100 feet—in spite of the fact that all raw material deliveries were planned to be made by truck. Thus, in case the truck should be out of service, deliveries could be made by tank car.

Storage Tanks

Besides the generating unit each plant is equipped with two storage tanks, the sizes varying according to the size of the towns. At Lancaster, with 300 potential customers and a peak-hour delivery of 1800 cubic feet, or a maximum daily sendout of 18,000 cubic feet, the tanks are 4 feet in diameter and 40 feet long, with a working pressure of 150 pounds per square inch and a capacity of 3500 gallons each.

It was decided to use two small tanks rather than one large tank for two reasons: (1) operation would be simplified and more flexible, should it become necessary to shut down a tank for repairs; and (2) two tanks were less costly than one of equal capacity, tank construction being cheaper due to lighter weight material.

All liquid deliveries are made from a refinery near Los Angeles on a day's notice and by tank truck. The truck was designed expressly for this purpose and has a capacity of approximately 3100 gallons. A complete description of this truck and the method of operation is given in the May, 1931, issue of *Western Gas*.

The liquid is delivered from the trucks to the bottom of the storage tanks by gravity, by means of a connection at the curb line of the property. A 2-inch flexible hose is connected from the truck to the curb connection. All metallic connections are bonded as a safety measure to prevent sparks from static. The filling connection at the curb is also a safety measure against fire at the truck, which

SCAIFE

LIQUEFIED PETROLEUM GAS

CYLINDERS

MANUFACTURED
AND TESTED
TO MEET
INTERSTATE COMMERCE
COMMISSION
SPECIFICATIONS

WM. B. SCAIFE & SONS, CO.

OAKMONT, PA.

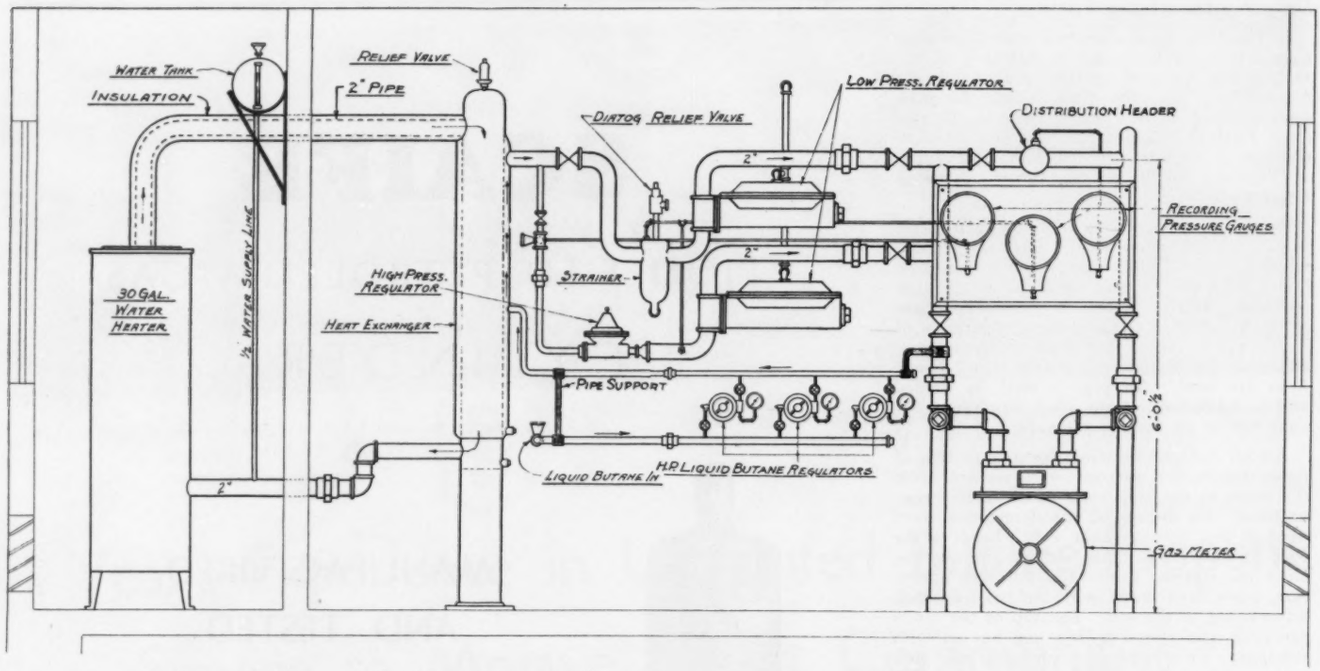
NEW YORK PITTSBURGH CHICAGO

LEADERS IN AIR BUTANE DEVELOPMENT ON THE PACIFIC COAST

▼

NATURAL GAS CORPORATION OF CALIFORNIA
NATURAL GAS CORPORATION OF WASHINGTON
NATURAL GAS CORPORATION OF OREGON

San Francisco and Portland



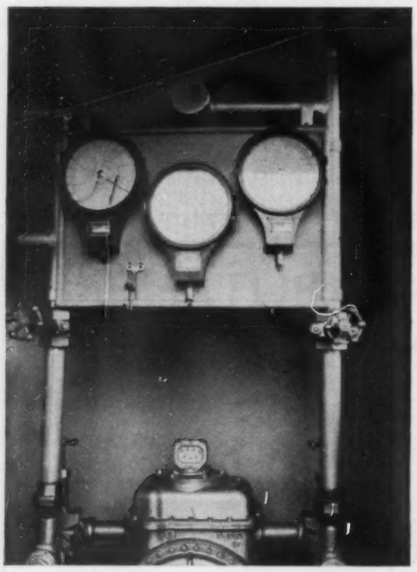
Flow sheet (front elevation) showing operation of undiluted butane plant of type in use by Southern California Gas Co.

might destroy the plant if unloading took place too near the tanks.

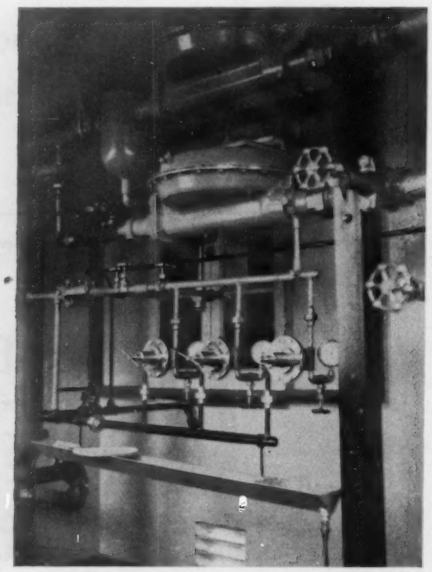
In addition to the 2-inch filling line, a ¾-inch equalizing line is connected from the top of the storage tank during process of filling to the top of the tank truck. The inflowing liquid displaces the vapor at the top of the storage tank, which in turn flows back to the tank truck. A laboratory test indicated that 35 cubic feet of this vapor at atmospheric pressure of 14.7 pounds per square inch was equal to 1 gallon of liquid; therefore, in order to keep a correct balance on deliveries a portable meter is connected in the equalizing line at each unloading. By observing the pressure of the passing vapor through the meter and applying the proper conversion factor to the meter reading, the exact amount of vapor return is known. This, converted into gallons, means a return to the tank truck of from 35 to 70 gallons per delivery, depending upon the vapor pressure in the tank. The pressures in these storage tanks vary from 20 to 130 pounds per square inch, depending upon atmospheric temperature.

Generating Equipment

The gas generating equipment was fabricated and completely assembled in the Southern California Gas Co.'s shops, moved to its destination and installed. Each unit is the same size and consists mainly of three metal diaphragm acetylene regulators, one ¾-inch high pressure regulator, two 2-inch low pressure regulators, one heat exchanger, two station meters and one automatic storage water heater.



Pressure gauge panel for recording pressures on storage tank, inlet pressure on low pressure regulator and pressure on distribution system.



High pressure liquid butane regulators and low pressure butane gas regulators. Both views are of the plant at Lancaster, Calif.

The liquid butane is taken from the bottom of the storage tanks and put through the three small metal diaphragm acetylene regulators, thereby reducing the pressure from an average of 70 pounds to 10 or 12 pounds. (Each of these regulators, however, is set at a different pressure, so that in case one or two of them should stick through freezing, the third is still available for passing gas, which further allows the two remaining frozen regulators to thaw out.) At this pressure the liquid is transformed into a gaseous state. This gas then passes through a heat exchanger as, due to the drop in pressure, there is a considerable drop in temperature. The heat exchanger consists of a 6-inch pipe inside of an 8-inch pipe. The 6-inch pipe is supplied with hot water from the circulating water heater. The gas passing through the annular space between the 6-inch and 8-inch pipe is brought up to a temperature between 60 and 70°. From this point the gas passes to a low pressure regulator, the pressure again being reduced to approximately 12 inches of water, and thence through the station meter into the distribution system.

Safeguarding Supply

If for any reason the supply of liquid butane from the bottom of the storage tanks should be cut off, a line from the top of the storage tank will automatically supply propane gas through a high pressure regulator, which is set at 10 pounds, thence on through a low pressure regulator, which is set at 9 inches of water pressure.

The propane line on the top of the storage tank is always open; however, when the liquid butane passes through the generating equipment properly the propane gas does not

flow through, as the extra 3-inch water pressure which the liquid gas exerts on the outlet side of the low pressure propane regulator will not allow the propane gas to flow through the station meters.

Three 7-day recording pressure gauges are installed for recording the high, intermediate, and low or distribution pressures.

It also might be of interest at this point to mention that all piping and equipment is painted in a special color scheme to designate whether high, intermediate or low pressure is carried. Each plant is equipped with a diagrammatic layout and operating instructions, which are framed in a glass case and hung on the wall where they can be seen easily and understood by any one looking after the plant if the regular man is off duty. One man operates the three plants, besides taking care of main extensions, meter and appliance sets, and meter readings.

Checking Efficiencies

In order to determine our plant efficiency, or in other words, to determine whether the generating plant is producing the required cubic feet per gallon, a very accurate check is made each month. This check determines the exact amount of liquid and vapor on hand, the amount received during the month, and the amount used. The quantity on hand the current month, subtracted from the amount on hand the preceding month, plus the amount delivered, is the amount used. The cubic feet of gas passing through the meter, divided by the amount used, gives the cubic feet of gas generated from a gallon of liquid butane-propane. This figure varies from 32 to 33.5 cubic feet per gallon, which is calculated from the refinery's analysis. The plant efficiencies thus far have been approximately 99.6 per cent.

Due to the extreme weather conditions in this area, it was felt necessary to have two specifications for our liquid butane—one for the summer months and one for the winter months—which are as follows:

Summer Mix		Winter Mix
24%	Propane (Approx.)	36%
76%	Butane (Approx.)	64%
32.68	Cu. ft. per gal. (Approx.)	33
3043	B.t.u. per cu. ft. (Approx.)	2960

From the above it is seen that the thermal value of our winter and summer mix varies approximately 83 B.t.u.'s per cubic foot, but to date this difference has not affected utilization, except in a few extreme cases where the appliance was adjusted either for the summer or winter mix to an extremely fine point in the air-gas ratio. At present a study is being made to find a mix between the two points that will justify one mix for year-round service.

Following is statistical information for the first six months which these plants were in operation:

Total M.c.f.	1475
Total gals.	45,000
Revenue	$7,195.89
Active Meters	290
Per Month Per Active Meter—	
M.c.f.	1.0
Gals.	30.3
Rev.	5.07
Average Rate—	
M.c.f.	4.99
Gals.	.158
Pound	.0344

The sendout, unaccounted for, for the year to date is 3 per cent. This 3 per cent includes

31 Towns have turned to Parsons-Kemp

BUTANE DILUTION PLANTS

These are the Towns

Calais, Me.
Cleveland, Tenn.
Harrisonburg, Va.
Linton, Ind.
Watertown, S. D.
N. Manchester, Ind.
Shenandoah, Iowa
Sheridan, Ind.
Kerryville, Texas, 1
Clinton, Miss.
Winslow, Arizona
Clarinda, Iowa
Maryville, Miss.
Missouri Valley, Iowa
Eunice, La.
Mt. Airy, N. C.
Aiken, S. C.
Martinsville, Va.
Pulaski, Va.
Radford, Va.
Chester, S. C.
Kerryville, Texas, 2
Lakeview, Oregon
Trinidad, Colo.
Beach Haven, N. J.
Goodland, Kans.
Wareham, Mass.
Falmouth, Mass.
Pocomoke City, Md.
Catskill, N. Y.
Canajoharie, N. Y.

Widespread acceptance is proof of value. Already more than 30 towns from Maine to Oregon have installed Parsons-Kemp Butane dilution plants. The outstanding advantages which influenced these other operators are well worth your consideration:

1. Parsons-Kemp dilution equipment is the result of sixty years' engineering and manufacturing experience in automatic gas-air proportioning systems. Parsons-Kemp equipment has PROVED its dependability.
2. Parsons-Kemp units are adaptable to high, intermediate and low pressure systems—and are capable of supplying hourly requirements varying from 3,000 to 60,000 cubic feet.
3. They can be installed in surprisingly small space—say 60 sq. ft. in the corner of a room.
4. They can be operated with a minimum of skilled attention.

The Parsons Engineering Company, affiliated with the C. M. Kemp Mfg. Co., offers you a threefold service:

A. Planning, supplying equipment for and building complete plant or plants.

B. Planning, supplying equipment, arranging of contracts for and supervising construction of complete plant or plants.

C. Supplying equipment for plant or plants.

For complete information on Parsons-Kemp equipment, engineering service, and operating data on present Parsons-Kemp town gas plants, write to the:

Parsons Engineering Company
525 Market Street, San Francisco

AFFILIATED WITH THE C. M. KEMP MFG. CO.

GROBLE REGULATORS & GOVERNORS

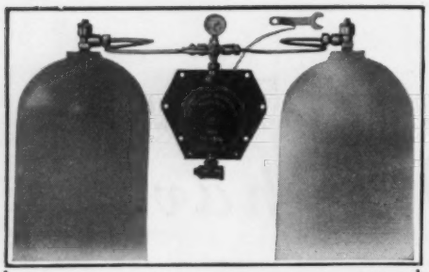
Complete Line of Regulators for

Natural, Manufactured, Butane and Propane Gas

Pacific Coast Representative,

T. G. ARROWSMITH COMPANY,
661 Howard Street San Francisco, Calif.
Phone Garfield 8419

GROBLE GAS REGULATOR COMPANY
Office and Factory: Anderson, Indiana



The *Only* COMPLETE Propane Gas CONTROL

A complete manifold and regulating unit, work tested and factory assembled . . . the only *complete* liquefied petroleum gas control assembly you can buy; fortunately Rego-made . . consists of connections to cylinders, a 2-way throw-over valve (to shut off one side automatically when the other is opened), a regulator, mercury seal, supply of mercury, wrench . . . complete and ready to install.

In One Package

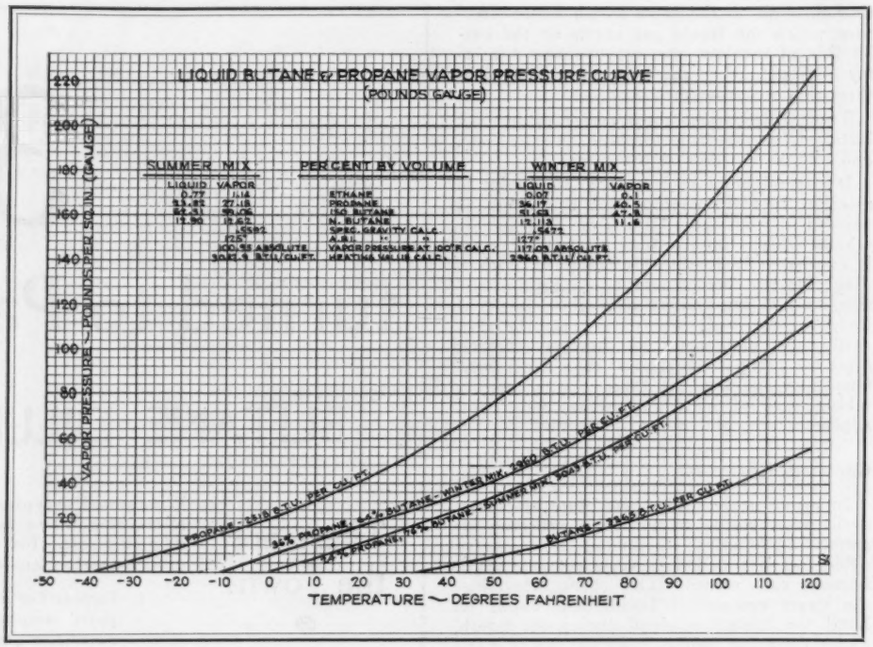
The REGO complete manifold and control unit is factory assembled and tested under actual working conditions . . . then packed in a substantial re-shipping carton.

Ready to Ship *for* Field Installation

Sell the job . . . ship the equipment, including the REGO carton . . . then send a man out to hook it up. That's what REGO means to the Liquefied Petroleum Industry!

Write **We have a wealth of data on marketing, and distribution; complete files on research and application. Ask us any question without obligation.**

The Bastian-Blessing Co.
254 East Ontario St.
Chicago, Ill.



gas lost in purging lines for new extensions and gas lost in making service connections.

This butane gas is sold on a pound basis at the following rate:

First 100 lbs., per lb.	$.0525
All Over 100 lbs., per lb.	.02
Minimum Charge, per month	$1.00

Gas consumed is registered by volumetric meters in units of 10 cubic feet, each of which is the equivalent of 1.42 pounds of gas. Thus the recorded consumption multiplied by 1.42 is the number of pounds billed at the stated rate.

At the time the preliminary study was made as to the possible number of customers to be obtained for the first year, an estimate of 333 was thought to be conservative. The number of electrical consumers—out of a population of 3600—were approximately 266. Assuming that one-half of the electrical consumers would change over to gas and 200 non-electric consumers would use gas this would make a total of approximately 466 users of electricity and gas, or approximately 13 per cent of the total population.

After 10 months of operation, gas is being served to some 319 customers. A goal of 400 has been set for the first year, with still an unreached saturation point. This accomplishment can be credited to the continuous effort of the company's new business department. From the moment that final approval was given by the management to proceed with this project, an intensive selling campaign began. Cooking schools were held, and demonstrations of various kinds were put on in churches, schools and public places. Salesmen were busy making house-to-house canvasses, selling appliances and lending every possible assistance to local plumbers to speed up house piping, etc. Everything in a clean-cut, legitimate way was done to cooperate with local merchants and civic authorities to create a welcome. All building materials for the construction of the plants were purchased locally wherever the prices were on an equal basis. Also, after the systems were finished and ready for operation, the local newspaper men and members of the chamber of commerce were invited to participate in a turning-on ceremony, all of which greatly stimulated interest and goodwill.

DAILY BUTANE PLANT REPORT

	Tank No. M-222	Tank No. M.-223
Outside Temperature	60°F.	60°F.
Tank Temperature	67°F.	64°F.
Tank Pressure	55 lbs.	55 lbs.
Gauge Glass Reading	1 ft. 1⅛ in.	5⅛ in.
Gallons on Hand 8:00 A.M. yesterday	871	205
Gallons received yesterday	0	0
Gallons on Hand 8:00 A.M. today	811	200
Gallons used yesterday	60	0
Gallons used this month to date	535	0
Station meter reading 8:00 A.M. today		1,107,800
Station meter reading 8:00 A.M. yesterday		1,105,050
Cu. ft. gas through station meter yesterday		2,750
Cu. ft. gas through station meter this month to date		19,520
Cu. ft. gas through water heater meter yesterday		30
Cu. ft. gas through water heater meter this month to date		200

Note: All gallonage figures must be corrected to 60°F.

Typical data recorded each day for Lancaster butane plant of Southern California Gas Company.

Bartlett Resigns Post With Natural Gas Corp. of Calif.

Thomas E. Bartlett, formerly manager of sales for the Natural Gas Corp. of California, has severed his connection with the utility to associate himself with the Pacific Gas Heating Co., 424 Sutter Street, San Francisco, where he will have charge of the territory embraced by Pacific Gas and Electric Co.'s North Bay, Sacramento, San Joaquin and Coast Valley Divisions, as well as all Coast County and Natural Gas Corporation of California territory.

Pacific Gas Heating Co. is the California distributor for an Eastern automatic water heater and manufacturer of the Mars gas furnace.

Arizona Gas Co. Serving Air-Butane at Winslow, Ariz.

Arizona Gas Co., Winslow, Ariz., a subsidiary of Occidental Gas Securities Co., Los Angeles, reports completion of the butane gas distribution system at Winslow. The system will serve 550 B.t.u. air-mixed butane through a high pressure distribution system. The mains are welded as are all active services. Sprague meters were used throughout. On September 14 the company reported 400 active services.

An office and appliance store has been opened at 306 Kinsley Ave., featuring Wedgewood ranges and Pacific water heaters and heating equipment.

Falmouth, Mass., Butane Plant Now in Operation

Buzzards Bay Gas Company has completed and placed in operation the second of its air-butane gas plants. This plant will supply the Falmouth district of the company. The output capacity of the plant is 7,000 cu. ft. per hour and provision is made for additional units. The company in July 1930 placed in operation its first air-butane gas plant to supply the Wareham district of the company, this plant having a capacity of 9,000 cu. ft. per hour.

Plant at Hyannis, Mass., Completed by Barnstable County Gas Co.

Barnstable County Gas Co. has completed and placed in operation its air-butane plant at Hyannis, Mass. The new plant will serve Barnstable, Yarmouth, Dennis, Harwich, and Chatham, Mass. A distribution system has been completed at Hyannis, and extensions of mains will be started in parts of Yarmouth, Dennis and Harwich at an early date. The Robinson Management Association, Inc., Boston, Mass., is operating the property.

Plan to Extend Klamath Falls Service Area

Plans have been completed by the Natural Gas Corp., of Oregon, Portland, for an extension of gas service to Altamont and St. Francis Park additions, south of Klamath Falls, according to S. R. Sharpton, manager for the company at Klamath Falls.

Asking Kingman Franchise

Harry C. Keys, Kingman, Ariz., is applying for a franchise for the distribution of butane gas in Kingman, Ariz.

Wauge to Replace Quinby at Shelton

M. E. Wauge has been appointed as representative for Natural Gas Corp. of Washington at Shelton, Wash., to succeed E. Quinby.

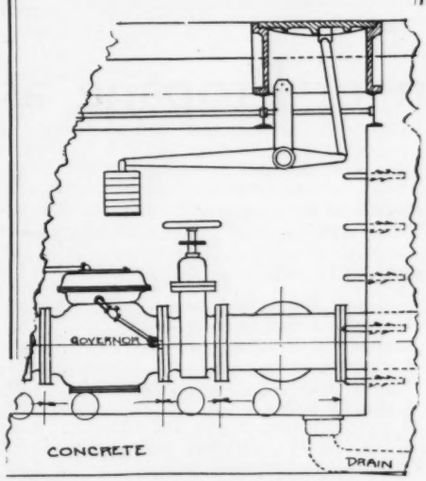
"STANDARD"
BU-GAS
A COMMERCIAL BUTANE OF EXCEPTIONAL PURITY

The high calorific value of Bu-Gas and its comparatively low vapor pressure result in economical storage and adapt it particularly—FOR GAS MANUFACTURE OR ENRICHMENT—FOR PEAK LOAD PRODUCTION

Any Standard Oil Representative Will Gladly Furnish Full Information

STANDARD OIL COMPANY OF CALIFORNIA

Connelly Iron Sponge & Governor Company

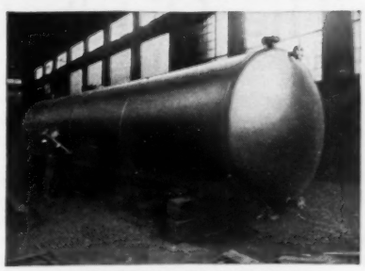


Counter-Balanced Manhole

Write for Bulletins

ELIZABETH NEW YORK CHICAGO

.Biggs. Welded Vessels



WELDED BUTANE RECEIVERS

BIGGS Welded Butane Receivers effect a real economy by eliminating the maintenance trouble and expense usually encountered under severe working conditions. The Biggs weld is ductile, uniform, and stronger than the plate itself. Data upon request.

THE BIGGS BOILER WORKS CO., Akron, Ohio

TABLE NO. 2. INVESTMENT PER CUSTOMER

Number of Customers	*Customer Equipment	Trucking Equipment	Reserve Supply of Equipments	Investment per Customer	**Capital Charges 16%	Station Equipment	Investment per Customer With Station	Capital Charges 16%
100	$ 5,000.00	$1,000.00	$4,000.00	$100.00	$ 1,600.00	$20,000.00	$300.00	$ 4,800.00
250	12,500.00	1,000.00	4,000.00	70.00	2,800.00	20,000.0	150.00	6,000.00
500	25,000.00	2,000.00	4,000.00	62.00	4,960.00	20,000.00	102.00	8,160.00
750	37,500.00	2,000.00	4,000.00	58.00	6,960.00	20,000.00	84.66	10,160.00
1000	50,000.00	3,000.00	4,000.00	57.00	9,120.00	25,000.00	82.00	13,120.00
1500	75,000.00	4,000.00	4,000.00	55.33	13,280.00	25,000.00	72.00	17,280.00
2000	100,000.00	5,000.00	4,000.00	54.50	17,440.00	25,000.00	67.00	21,440.00

* Based on $100 cost less $50 lease price to customer.
** Includes Interest, 7%; Taxes, 3%; Insurance, 3%; Depreciation, 3%.

TABLE NO. 3. COST PER POUND, INDIRECT CHARGES

		Capital Charges			
		——Without Station——		——With Station——	
Number of Customers	Annual Fuel Load in Pounds	Per Pound	Per 100-Lb. Cylinder	Per Pound	Per 100-Lb. Cylinder
100	40,000	$ .040	$4.00	$ .120	$12.00
250	100,000	.028	2.80	.060	6.00
500	200,000	.0248	2.48	.0408	4.08
750	300,000	.0232	2.32	.0339	3.39
1,000	400,000	.0228	2.28	.0328	3.28
1,500	600,000	.0221	2.21	.0288	2.88
2,000	800,000	.0218	2.18	.0268	2.68

(Based on consumption of 400 pounds per customer per year or 33⅓ pounds per customer per month.)

TABLE NO. 4. PRICE SCHEDULE PER POUND—BASED ON 100-POUND CYLINDERS

	Fuel Purchased from Producer's Bulk Station			Fuel Purchased in Tank Cars		
Quantities per Quarter Year	Wholesale at Bulk Station	Cylinder Filling Fee	Total Cost F.O.B. Bulk Station	F.O.B. Producer's Tank Cars	Average Freight	Total Delivered Cost at Purchaser's Bulk Station
0 - 3,000	$ .1000	$ .25	$ .1025	$ .0165	$ .012	$ .0285
3,001 - 15,000	.0500	.25	.0525	.0165	.012	.0285
15,001 - 30,000	.0485	.25	.0510	.0165	.012	.0285
30,001 - 60,000	.0470	.25	.0495	.0164	.012	.0284
60,001 - 90,000	.0455	.25	.0480	.0162	.012	.0282
90,001 - 120,000	.0450	.25	.0475	.0162	.012	.0282
120,001 - 180,000	.0445	.25	.0470	.0160	.012	.0280
180,001 - Over	.0440	.25	.0465	.0159	.012	.0279

The Distribution of Propane as "Bottled Gas"

is of 100 pounds capacity, although many of the 50-pound and 60-pound cylinders are still in use. The present ratio of one pound of steel to one pound of fuel load is a big step forward from the Blaugas cylinder which weighed 80 pounds and contained only 25 pounds of gas. The present propane containers are Interstate Commerce Commission cylinders, identified as "I.C.C. No. 4B-240." The construction specification is 4B and the design pressure is 240 pounds with a test pressure of 480 pounds.

Two cylinders are, of course, installed at the customer's location in the two-drum cabinets, but an additional cylinder must be held in reserve to be delivered upon the exhausting of one cylinder of the customer. This means an investment in at least three cylinders per customer. Some distributors have been able to operate on a smaller reserve of cylinders, but this is mainly due to the strategic location of the above mentioned producer bulk stations. Where it once required from two weeks to a month for an empty cylinder to be shipped to the filling point, which was at the producing field, and returned, it is now usually possible to do the same in one day or less by truck.

(Continued from Page 47)

Investment per Customer

The investment in a customer's equipment under the two-drum system is approximately $60, and is divided as follows:

1 cabinet 16x35x59 inches	$10.50
1 regulator and mercury seal	4.50
1 manifold including two pigtails	5.00
1 concrete base	.75
1 padlock	.30
1 shut-off cock	.70
25 feet (average) piping and fittings	4.00
3 ICC 4B-240 cylinders with valves	33.00
Freight on above equipment	2.00
Total	$60.75

Adding an average installation cost of $15 to the above figures, we have a total cost of $75.75. This figure, however, does not include office work, checking installation, supervising costs and other miscellaneous items that must normally be expected and taken into account. For estimating purposes we will assume these amount to $10 per customer per installation. Another fact which is often not considered in making estimates is the multiple installation. Figures based on experience show that there are about 1.2 equipments installed per customer. We thus see that the average investment per customer will run almost $100.

On the generally adopted two-drum lease plan the usual cost to the customer is $45 to $50; thus the distributor has an actual investment of the difference between $100 and $50, which is $50 per customer, on which capital charges must be met. In case no appliance is sold or where little or no profit is made, the actual investment many times is as much as $60 to $75. Where a bulk station is owned and operated by the distributor its investment cost must be divided by the number of customers to determine the added figure on which capital charges must be made. In any event, the trucking equipment, reserve supply of new equipment, stock of appliances, working capital, store and office fixtures, etc., must be considered. Table No. 2 shows the average investment per customer on a basis of the number of customers owned.

The first four columns of this table show the investment necessary in customer equipment, trucking equipment, reserve supply of

TABLE NO. 5. COST AND PROFITS PER POUND ON FUEL SALES WITHOUT BULK STATION

Number of Customers	Cost of Fuel	Capital Charges	*Delivery	Overhead	Total	Selling Price Average	Net Profit
100	$ .0525	$ .0400	$ .0325	$ .01	$ .1350	$ .115	**$ .0200
250	.0510	.0280	.0315	.01	.1205	.115	** .0055
500	.0495	.0248	.0310	.01	.1153	.115	** .0003
750	.0480	.0232	.0290	.008	.1082	.115	.0068
1,000	.0475	.0228	.0280	.0075	.1058	.115	.0092
1,500	.0470	.0221	.0270	.0065	.1026	.115	.0124
2,000	.0465	.0218	.0260	.0050	.0993	.115	.0157

* Delivery costs include transportation from producer's bulk station to distributing point.
** Loss.

TABLE NO. 6. COSTS AND PROFITS PER POUND ON FUEL SALES WITH BULK STATION.

Number of Customers	Cost of Fuel at Bulk Station	Total Capital Charges	*Station Operation	Delivery Expense	Overhead	Total Cost	Average Selling Price	Net Profit
100	$ .0285	$ .1200	$ .0275	$ .0275	$ .0150	$ .1935	$ .115	**$ .0785
250	.0285	.0600	.0025	.0265	.0150	.1325	.115	** .0175
500	.0284	.0408	.0022	.0250	.0150	.1114	.115	.0036
750	.0282	.0339	.0022	.0215	.0130	.0988	.115	.0162
1,000	.0282	.0328	.0020	.0205	.0125	.0960	.115	.0190
1,500	.0280	.0288	.0020	.0200	.0090	.0878	.115	.0272
2,000	.0279	.0268	.0018	.0190	.0075	.0830	.115	.0320

* Includes Fuel Losses.
** Loss.

TABLE NO. 7. INTEREST ON INVESTMENT.

Number of Customers	Pounds per Year	WITHOUT Bulk Station Investment	Earnings	Percent*	WITH Bulk Station Investment	Earnings	Percent*
100	40,000	$10,000.00	$ 800.00**	8.0**	$ 30,000.00	$ 3,140.00**	10.4**
250	100,000	17,500.00	550.00**	3.1**	37,500.00	1,750.00**	4.7**
500	200,000	31,000.00	960.00**	0.2**	51,000.00	720.00	1.4
750	300,000	43,500.00	2,040.00	4.7	63,500.00	4,860.00	7.8
1,000	400,000	57,000.00	3,680.00	6.5	82,000.00	7,600.00	9.3
1,500	600,000	83,000.00	7,440.00	9.0	108,000.00	16,320.00	15.1
2,000	800,000	109,000.00	12,560.00	11.5	134,000.00	25,600.00	19.1

* Interest in addition to 7% included in Table II.
** Loss.

equipments, the investment per customer and the annual capital charges that must be earned where operation is handled without a bulk station. The last three columns show the approximate investment necessary for a bulk station, the investment per customer and the necessary capital charges where the fuel is purchased in tank car lots and handled through the distributor's own bulk station.

For complete analysis it is necessary to break down the capital charges given in Table No. 2, which has been done in Table No. 3. Experience shows the average consumption for all customers is 400 pounds per year and the capital charges per pound have been arrived at on this consumption. For convenience, and to emphasize the large percentage these indirect charges make of the total cost, a conversion has been made to cost in dollars per 100-pound cylinder. Many distributing companies and the majority of prospective distributors fail to consider these indirect costs, which amount to so much, and it is the failure to take them into account in anticipating earnings that has caused many "bottled gas" companies to go into receivership or to drop from the picture.

The delivery costs and station costs shown in Tables No. 5 and No. 6 are based on the use of 100-pound capacity cylinders. Where 50-pound or 60-pound cylinders are used the expenses will be greater per pound. It is necessary to retest all I.C.C. cylinders every five years and the costs of this testing, which will amount to from 50c to $1 each, must be deducted from the net earnings every five-year period, or a yearly reserve must be set up to cover this expense. The equipment necessary for testing represents an investment of approximately $1,000.

Commodity Prices

The usual wholesale price of propane at a distributor's bulk station is in the neighborhood of $.05 per pound and a charging fee of $.25 per cylinder is usually assessed. This fee is not only to take care of labor charges, but also amounts to giving a discount to the distributor bringing the larger cylinders to be filled. A fee of $.25 amounts to $.0025 per pound on a 100-pound cylinder, while it is $.00416 per pound for a 60-pound cylinder. In tank cars the fuel is usually sold on a sliding scale from $.07 to $.06 per gallon or $.0165 to $.0142 per pound F.O.B. shipping point. The freight ranges from about $.02 to $.055 per gallon or from $.0047 to $.013 per pound. In Table No. 4 the usual scales of prices are given in cylinder lots and in tank cars. In this table the freight is taken as $.012 per pound, rather than at a lower figure so as to cover the majority of cases.

Using the cost figures in Table No. 4 and the capital charges in Table No. 3 with assumed delivery and overhead costs, Table No. 5 gives the total cost per pound and the net profit or loss based on an average selling price of $.115 per pound. Individual cylinders in small lots are usually retailed at $.12 per pound, but the large commercial customers buying at lower rates bring the average to approximately $.115 per pound. Table No. 6 gives the same information based on the purchase of fuel in tank car lots.

Earnings Possibilities

Summing up the above facts and figures, Table No. 7 shows the earnings on the investment for the system, both with and without bulk storage facilities. It is noted that a loss is occasioned on a distributorship with less than 500 customers and little return is earned on 500, especially when it is probably true that the majority of companies are operating on borrowed money and thus must pay out the 7 per cent figured in the capital charges in Table No. 2.

Five hundred customers will earn a possible 1.4 per cent varying somewhat with the fuel supply plan. From 750 customers up, the earnings are more attractive, but not excessive.

There has been a tendency on the part of producers and wholesale distributors to sell their products to any and all prospective dealers, regardless of the would-be dealer's financial standing or business ability. After getting such accounts the producer often does not make their problems his own, and allows them to drift in the dark, using haphazardous and dangerous methods of installation, poor selling plans and little customer service. From Table No. 7 it is seen that a small dealer cannot make a profit on his necessary investment. He frequently forgets

or is unaware of the necessary and ever-present capital charges. These facts should be kept in mind by the distributor and outlined to the prospective dealer who wants to buy his own cylinders and equipment to serve "bottled gas." Until the producers recognize the far-reaching and detrimental effect of the above state of affairs the industry will continue to be unstable.

Many gas utility companies are now cooperating with existing "bottled gas" companies in furnishing gas service to the customers beyond their mains. This service has been made possible without the necessity of the utility company making any investment in cylinders and other equipment. Generally, the utility makes a sale of an appliance adapted to burn propane and the distributing company makes the installation and services the customer. This makes possible future main extensions on the immediate promise of a paying load. It sells the home owner on "gas", creates good will for the utility, and gives the distributor gas customers for a reasonable time without much selling expense.

The year 1931 is the most successful the "bottled gas" industry has enjoyed, and a substantial number of new customers are being added daily. The industry has now reached a point where the majority of people know of its existence and service; thus, the desire is increasingly greater to utilize the advantages of "gas beyond the mains." It is needless to say that the best territories in which to obtain concentration of customers are those suburban districts around the more densely populated centers. These families as a rule have used gas previously in the city, and will not go back to the inconvenient gasoline or kerosene stove or to the burdensome coal or wood appliance.

El Centro Air-Butane Plant to Build

PLANS have been completed by Natural Gas Corp. of California, San Francisco, for construction of a new air-butane gas plant at El Centro, which will be the largest plant of its type in operation on the Pacific Coast, and will be constructed under the supervision of Standard Management and Operating Corp.

At the present time this is the only oil-gas plant operated by Natural Gas Corp. of California, the property formerly being known as the Inland Empire Gas Co. and becoming a part of the Natural Gas Corp. system during the latter part of 1930. The conversion of this system to air-butane gas will be completed without interruption to present service, and it is anticipated the new plant will be ready to cut over during the latter part of November or the first of December of this year. A. E. Hall, engineer in charge of construction for Standard Management, is supervising the work.

Plans call for construction work to get under way immediately on the El Centro plant, which will have a capacity of 60,000 cubic feet of gas per hour. There will be two 15,000-gallon liquid storage tanks. The present 90,000 cubic feet of low pressure gas storage capacity will be increased to 135,000 with the addition of new high pressure tanks with a capacity of 45,000 cubic feet.

The new plant building will be located on the present property of the company at El Centro, and will consist of a metal structure for the housing of the carburetting and control equipment, in addition to the tank storage equipment. Gas served will be of 550 B.t.u. The plant was designed by Parsons Engineering Co., for completely automatic operation. The Parsons-Kemp system of carburetion is used.

When completed, this plant will serve 1,300 meters, with a potential of 1,800.

In addition to building the new plant, the company is converting a number of low pressure mains to high pressure service.

New Inglewood District Office Opened

THE new Inglewood District Office of Los Angeles Gas and Electric Corp. was opened for business on Tuesday, September 8, and was formally presented to the people of the community on Saturday afternoon and evening, September 12, at an open house.

This addition to the business section of the community represents a total investment in land and building of approximately $225,000. The structure is of Class A construction, fireproof throughout; has two stories and basement, and is designed so as to permit the addition of another story when needed. It is 65 by 90 feet in size, with service yard 65 by 60 feet in the rear, containing a storage shed for automobiles and service trucks.

The exterior finish of the building is of Indiana limestone, carved and ornamented in the present day mode, and the whole structure, within and without, embodies the modern trend in architectural style.

The first floor contains the main business office and public lobby, decorated in the modern art style, with counters and floor of marble.

In the basement of the new building is provided a large auditorium and appliance display room, equipped with a demonstration platform and working kitchen for holding cooking classes and similar gatherings. It is the company's policy to make this auditorium available, without cost, to non-partisan groups for civic and community welfare.

About a year ago Los Angeles Gas and Electric Corp. announced that a new district, consisting of Inglewood, Hawthorne, Lennox, Lawndale, and that part of Los Angeles situated south of Slauson and west of Cypress, would be formed and a district office building would be erected in Inglewood.

C. A. Graves, who comes from the main office of the company, has been named manager of the new district. Mr. Graves has been in the employ of the organization for the past 22 years, in various commercial capacities which have fitted him to take charge of his new duties. For the past 8 years he has been assistant to the chief collector, which position he relinquishes to come to Inglewood. He will be ably assisted by E. A. Lodmell, who has been head of the former Inglewood branch office since July, 1927, as second in command.

AT LEFT: View showing exterior of the new Inglewood district office opened on September 12 by Los Angeles Gas and Electric Corp., Los Angeles, Calif.

Northwest Oil and Gas Assn. Planning Annual Conclave

Plans are getting under way for the annual convention of the Northwest Oil and Gas Association to be held in Seattle, Wash., November 6 and 7. The convention will open with a noon-day luncheon on November 6, to which the public will be invited, according to plans made at a meeting of the board of directors of the Association held September 10. Chambers of Commerce and service organizations throughout the Northwest will be invited to participate in the convention.

R. B. Newbern, president of the Northwestern Natural Gas Co., will present a paper on development of dry ice in Klicktat County, Wash., and S. A. McCune of the same company will have a paper on natural gas development in eastern Washington.

Two Bulletins Announced by Reliance Manufacturing Co.

Reliance Manufacturing Co., Alhambra, Calif., has recently brought from the press two new brochures. Bulletin No. 27 covers the new type H regulators, and Bulletin No. 28 deals with the complete line of appliance dead weight type regulators. Copies of either may be obtained by addressing the company at 1000 Meridian Ave., Alhambra, Calif.

United Gas Public Service Co. In New Lake Charles Office

United Gas Public Service Co., headquartered at Houston, Texas, recently moved into its new district headquarters at Lake Charles, La., where on August 22 a grand opening was held. A display of gas appliances and heating equipment has been placed on the floor by dealers and distributors, the company having adopted a policy of dealer-cooperation.

Garner Now on Natural Service

Natural gas recently was turned on in Garner, Iowa, through the mains of the Central States Electric Co., Cedar Rapids, Iowa.

A Stupendous Engineering Feat!

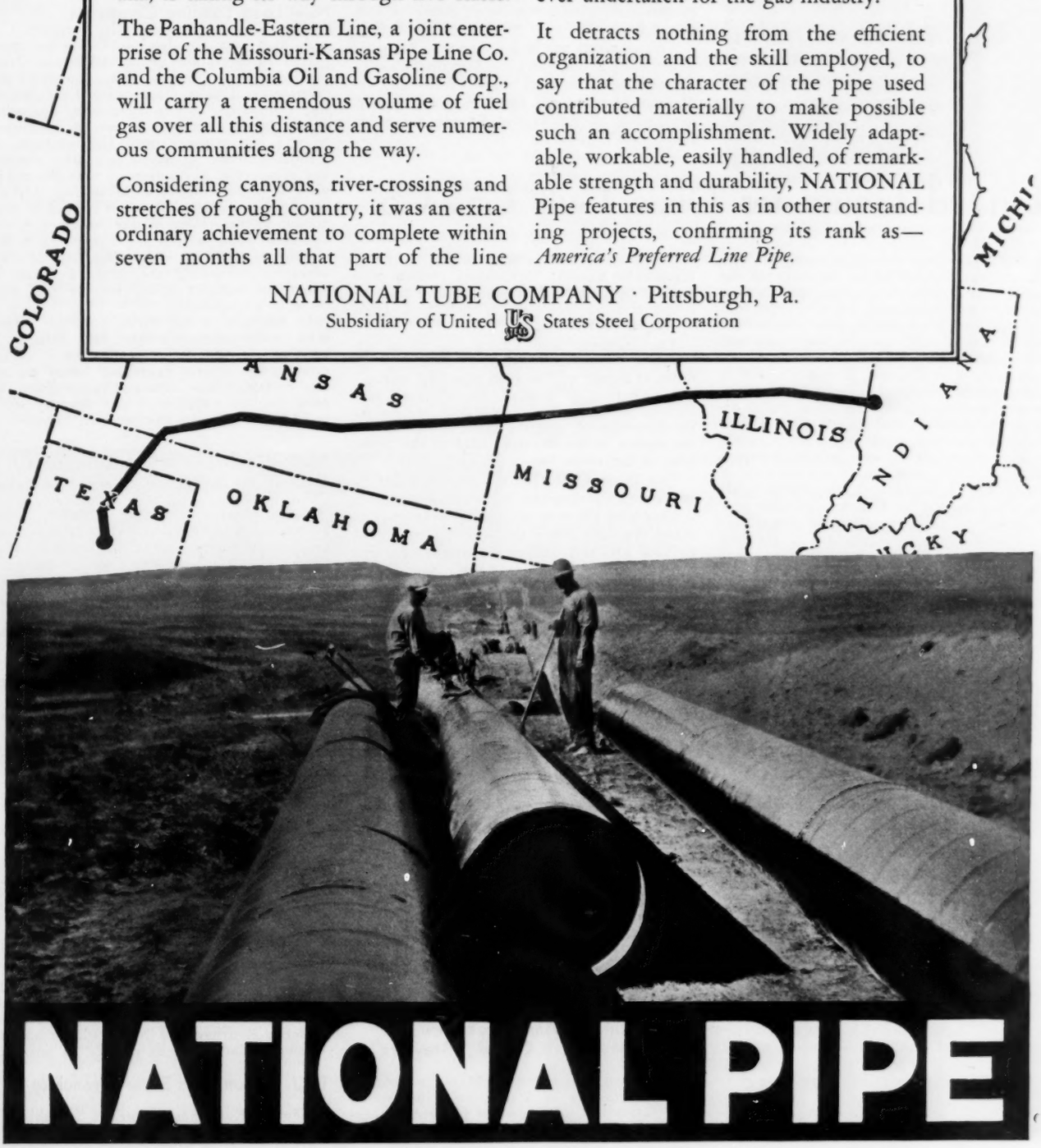
Across the Mississippi by special engineering measures, and over several other rivers by multiple-line construction, a great project that is to make natural gas flow from wells in the Texas Panhandle to Indiana, is taking its way through five states.

The Panhandle-Eastern Line, a joint enterprise of the Missouri-Kansas Pipe Line Co. and the Columbia Oil and Gasoline Corp., will carry a tremendous volume of fuel gas over all this distance and serve numerous communities along the way.

Considering canyons, river-crossings and stretches of rough country, it was an extraordinary achievement to complete within seven months all that part of the line extending from the Panhandle to the Mississippi. The whole enterprise now nearing completion, involving more than 1100 miles of pipe, is regarded as one of the most noteworthy feats of engineering ever undertaken for the gas industry.

It detracts nothing from the efficient organization and the skill employed, to say that the character of the pipe used contributed materially to make possible such an accomplishment. Widely adaptable, workable, easily handled, of remarkable strength and durability, NATIONAL Pipe features in this as in other outstanding projects, confirming its rank as—*America's Preferred Line Pipe.*

NATIONAL TUBE COMPANY · Pittsburgh, Pa.
Subsidiary of United States Steel Corporation



Kansas Pipe Line & Gas Co. Planning Reconditioning and New Construction

KANSAS PIPE LINE & GAS CO., with operating headquarters at Salina, Kan., and general offices at Topeka, announces through A. M. Patten, president, that the company is going ahead with reconditioning operations on a portion of the Stanolind Co.'s oil carrier. The company has leased the line from a point in Keith County, Nebraska, to Freeman, Mo. Gas will be put into the line through a connection with the existing 16-inch line at the Kansas-Nebraska border in Republic County, Kan. Franchises have been secured to serve Narka, Mahaska, Hoyt, Perry, Haddam City, Greenleaf, Morrowville, Barnes, Wheaton, Westmoreland, Emmett, Delia, Lecompton, Linn, Cleburne and Blaine.

From a point on the Stanolind line at Grantville in southwest Jefferson County, an 8-inch line will be built to Atchison, where the Kansas Power & Light Co., an affiliate, owns and operates a gas distribution system. From this line laterals will be constructed to serve Meriden, Oskaloosa, McLouth, Valley Falls and Nortonville, where franchises have been granted to the company.

The line from Grantville to Atchison will be approximately 40 miles long and laterals will bring its total mileage to 50. Twelve miles of line will be constructed from the end of the existing line at St. Mary's in a southeasterly direction to serve Rossville and Silver Lake.

Arrangements are also under way for construction of a line from the Stanolind line at Elmont, about 9 miles south of the city of Topeka, to serve gas for fuel to an electric generating station of the Kansas Power & Light Co., Topeka.

United Liquidates Dixie Gulf Gas Co.

ANOTHER step in the process of simplifying the corporate structure of the United Gas System was announced late in September in transferring all properties and assets of the Dixie Gulf Gas Co. to the United Gas Public Service Co., principal operating subsidiary of the United Gas Corp. headquartered at Houston, Texas.

Liquidation of the Dixie Gulf Gas Co. places extensive pipeline facilities under direct ownership of the United Gas Public Service Co. a few weeks prior to a public offering of the latter company's preferred stock.

Prior to its liquidation, the Dixie Gulf Gas Co. consisted of a main pipe line system extending from the Waskom compressor station in the Waskom gas field to Houston and Beaumont. The line consists of approximately 137 miles of 22-inch pipe from the Waskom compressor station to the Goodrich compressor station; 76 miles of 18-inch pipe from Goodrich to Beaumont and Port Arthur; and 63 miles of 16-inch pipe from Goodrich to Houston.

The company also has a line from the Waskom station to Marshall, consisting of 19 miles of 8-inch and 10-inch pipe line natural gas gathering systems in the Waskom and Panola fields; a field compressor station in the Panola field, and the main line compressor station in the Waskom field at the terminus of the main line.

The Dixie Gulf Gas Co. supplied gas to industrial consumers in Beaumont, Port Arthur and Houston as well as other points along the lines where the United Gas Public Service Co. and affiliates distribute natural gas to industrial and residential consumers.

Endorses A. G. A. Cooperative Principles

AT a meeting held August 31 by the Executive Committee of Missouri Association of Public Utilities at Jefferson City, Mo., a resolution was adopted endorsing the "Statement of Principles" suggested by the American Gas Association as a basis for cooperative trade relations between gas utilities and dealers. These principles were adopted by the A.G.A. and distributed to member companies.

Following is the text of the resolution adopted by the Missouri Association:

"BE IT RESOLVED: That the Missouri Association of Public Utilities wholeheartedly subscribes to the 'Statement of Merchandising Procedure' as accepted and published by the Electrical Merchandising Joint Committee at the Atlantic City meeting, June 9, 1931, and the 'Statement of Principles' suggested for the guidance of member companies of the American Gas Association, June 19, 1931, and recommend that member companies promptly review their merchandising policies now in force and bring them in line with those principles.

"That the weight of evidence clearly shows that where the utility promotes and sells gas and electric consuming appliances with due regard to sound merchandising principles and trade ethics, the best interests of the public, the merchants, and the utilities are served, and on this premise the Executive Committee of the Missouri Association of Public Utilities recommends that member companies promptly make contact with merchants in the territory served by them; lay frankly before them the facts as they are known and the policies they pursue.

"AND That the merchants be offered by the utilities a full measure of sound cooperation in the merchandising field, to the end that a full and harmonious merchandising job may be done to the best interest of all concerned."

Walworth Co. Announces New Emergency Valve Called "Gravitite"

Walworth Co., Boston, Mass., announces the manufacture of a new valve known as the "Gravitite" designed to prevent the escape of gas in case of fire. The new valve is constructed of malleable iron galvanized and equipped with a ball disc fused to the inside wall. When this ball is released by the action of heat, it automatically closes the valve.

The new device was designed to meet the requirements of a law recently passed in the state of Massachusetts which will go into effect on January 1, 1932, providing that gas companies shall attach to the intake pipe leading to the meter an automatic device designed to prevent or retard the escape of gas in case of fire, and approved as to design and construction by the Public Utilities Department. A number of such devices have been approved by the department, among them the Walworth "Gravitite."

Oklahoma Natural Inaugurates New Load Building Campaign

A new plan for load building has been placed in operation by the Oklahoma Natural Gas Corp., Tulsa, Okla., known as the "Employees Dealer Cooperative Load Building Campaign." The campaign, operating on the bonus plan, was begun on September 15 and will continue until December 19.

Each employee is asked to contact present and prospective gas consumers with the end in view of interesting them in adding to their gas-fired equipment. A bonus is paid in proportion to the amount of gas consumed by the appliance sold. Cards are distributed to the employees on which is kept the data of each customer, including the dealer's name to whom the prospect is sent for the final purchase of his appliance.

In addition to the bonus paid for added load on the company's lines, cash prizes will be given in each district to the employee receiving the largest aggregate bonus during the contest. The bonuses range from 25 cents for the addition of one laundry stove to $5 for a drilling gas account.

North Central Gas Co. Completes Operations in Wyoming and Nebraska

North Central Gas Co., Casper, Wyo., announces the completion of reconditioning operations on the portion of the Stanolind Pipe Line Co.'s oil carrier leased by the company, as far as Lewellen, Neb., as well as construction of laterals serving towns along the route of the line. Douglas, Wheatland, Guernsey, Ft. Laramie, Lingle and Torrington, Wyo., and Morrill, Mitchell, Scottsbluff and Gering, Neb., were on natural gas service by early September. The company's reconditioning operations on an additional 100 miles, serving Broadwater, Lisco, Oshkosh and Lewellen were scheduled to be completed later in the month.

The compressor station at Casper, Wyo., is also announced as completed and in operation.

Nebraska Natural Reported Serving from Stanolind Line

Nebraska Natural Gas Co., headquartered at Lincoln, Neb., is reported to be serving natural gas to the town of Gothenburg, Neb., from the old Stanolind oil carrier, now in the service of natural gas. It is reported also that towns in the Platte Valley as far west as North Platte will be served with natural gas from this carrier. Reports state that the line has already been reconditioned between Kearney and North Platte, and extensions being made as rapidly as possible.

D. J. Wilson Gets Severy Franchise

Severy, Kan., has granted a franchise for the service of natural gas to D. J. Wilson.

Dallas Gas Building Credit to Southwest Industry

View showing exterior of the Dallas Gas Building, new home of the Dallas Gas Co., the Lone Star Organization and affiliated companies.

ANNOUNCEMENT has been made of the opening on September 8 of the new 12-story Dallas Gas Building, located at Harwood and Jackson Streets, Dallas, Texas. The new structure will be headquarters for the Dallas Gas Co. and the Lone Star organization and their affiliated companies.

Coincident with the completion of the new building the Dallas Gas Co. embarks upon a new program of gas promotion, including a cooperative plan for display of gas appliances. This activity, made possible by adequate display space provided in the new building, will be carried on through a new department under the supervision of C. K. Patton, gas sales manager.

The gas sales promotion department includes the industrial department, with L. G. Waskom in charge, the refrigeration department, M. C. McClure, with Neal Stephenson, service man, the house heating department, with O. A. Kinzer, heating engineer, and Joe Morris, the home service department, with Albertine Berry director, and the domestic gas sales department including Stargas, with Sam Grasinger, supervisor. The staff includes K. C. Haggart, Joe Kendall, J. M. Lynn, Jr., and C. H. Redding, transferred from the shop to this department, Bennett Gannaway, and the Stargas salesmen, Charlie Woods and Clint Wilson.

The new promotional plans feature display and demonstration of the best types of appliances and are based on stimulating this business to combat encroachment of equipment using competitive fuels.

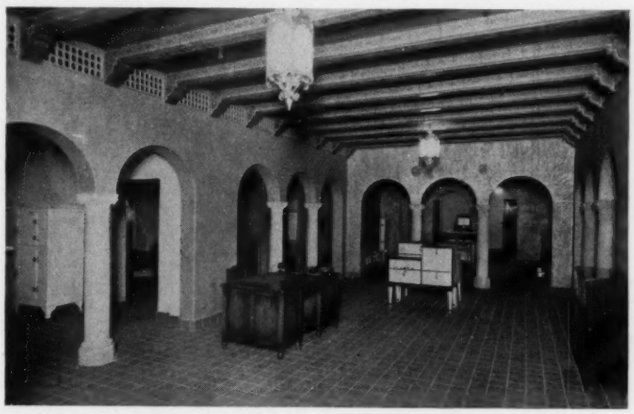
The policies adopted by the company in thus extending its field of usefulness are based on principles set forth by the American Gas Association and concurred in by a number of national dealers' associations, the purpose of these principles being to promote the use of gas through the efforts of both the dealer and the utility.

Gas equipment which the company is displaying includes several types of space heaters, incinerators, laundry dryers, furnaces, hotel and restaurant equipment, conversion burners, gas fired hot water or steam boiler equipment, several types of industrial burners and unit heaters for factory or store heating. Gas ranges displayed feature the latest models of insulated ranges with automatic heat control.

The building is of black granite, stone and brick, done in modern style with set-back architecture. It houses all departments of the Dallas Gas Co., executive offices and departments of the Lone Star Gas Co., the Municipal Gas Co., the Community Natural Gas Co., and the Texas Cities Gas Co.

L. B. Denning, president of the Lone Star Gas Co.; R. A. Crawford, vice-president; Frank L. Chase, vice-president and operating manager; Karl Griffith, general counsel, and D. L. Cobb, secretary-treasurer, all have offices on the 10th floor of the new building. On the eighth floor, which is devoted to the Dallas Gas Co., Henry C. Morris, president; R. G. Soper, vice-president and secretary, and R. M. Redding, general superintendent and chief engineer of the Dallas Gas Co., have their offices.

Equipment and employees to handle the 70,000 customer accounts of the Dallas Gas Co. are accommodated in the building, but officials are anticipating rapid growth of the gas industry in the Southwest, and have provided facilities for 10 additional stories to be added to the present structure. Most of the materials used came from within a 100-mile radius of Dallas and were manufactured with natural gas.



AT LEFT:

Downstairs lobby and display room in the newly completed quarters of the Dallas Gas Co. This lobby is of Spanish architecture with beamed ceilings and antique coloring.

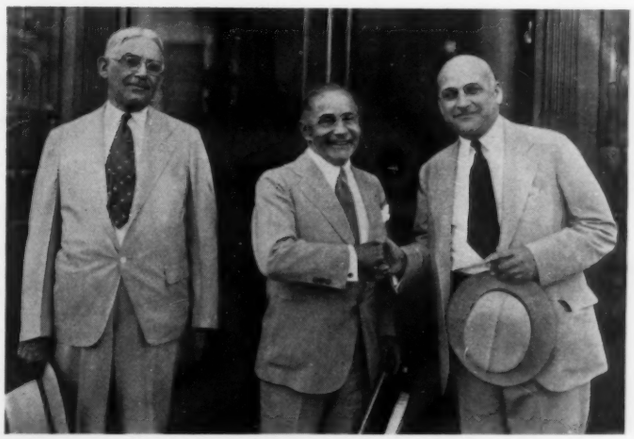
Two bronze revolving doors lead into the customers' lobby, which is decorated in black marble, bronze and cream-colored stone with a high beamed ceiling done in brilliant colors.

This lobby contains the departments of application, bill payment, duplicate bills, and service pipe estimates. Offices for adjustments, credit department, billing, bookkeeping, addressing, filing and collection are located on the second floor.

A downstairs lobby of Spanish architecture with beamed ceiling in antique coloring is devoted to a display bungalow. Here are four rooms, completely furnished, showing new models in gas apparatus for laundry, living room, kitchen and bath.

An auditorium for cooking schools and gas demonstrations, surrounded by a roof terrace, occupies the 11th floor, which is devoted to employees' club rooms containing a stage, motion picture screen and projector for educational purposes, and a kitchen.

All power, lights and electric current used in the 12-story building are supplied by three 165-H.P. gas engines in the basement. Each



AT RIGHT:

Opening Day, September 8, Henry C. Morris, president (right), and R. G. Soper, vice-president and secretary (left), were recipients of congratulations from J. W. Everman, city supervisor of public utilities in Dallas.

has direct connection to alternators generating 220-volt, three-cycle, alternating current with the fourth wire take-off for the 115-volt lighting circuit. This arrangement eliminates the necessity for transformers ordinarily used for the lighting circuit.

An economizer on the exhaust line of the engines utilizes heat usually lost in the exhaust gases. This economizer generates steam used to furnish the entire hot water requirements of the building, and in the winter, the surplus steam will be by-passed into the heating system. The amount of exhaust passing the economizer is controlled by butterfly valves in the exhaust line which will make it possible to pass any desired quantity through the economizer.

The heating requirements are furnished by two low pressure fire tube boilers each having a capacity of approximately 12,650 square feet of steam radiation. One of the boilers is equipped with atmospheric type burner, while the other has a power type. The duostat system automatically controls the temperature throughout the building, keeping it at the desired degree even in the mildest weather.

The first Silica Gel air conditioning system in the Southwest operates in the basement, furnishing conditioned air to the customers' lobby and the downstairs display room, as described in an article by L. A. Bickel appearing on Page 32 of this issue. Silica Gel is a hard glassy material manufactured from sand and sulphuric acid, resembling ice cream salt. It is extraordinarily absorbent, being able to take up 40 per cent of its own weight in water without increasing in size. One cubic inch of Silica Gel has an inner surface of more than an acre.

When air filters through the Silica Gel all moisture is removed. This bone dry air is blended with ordinary air to attain the right humidity and then cooled to maintain the proper indoor summer temperature. The result is made-to-order weather. After the Silica Gel has become saturated with water vapor from the air, gas heat is applied to dry out the gel, and it is again ready for use. The system supplies a complete air change in the conditioned area every seven or eight minutes.

Lone Star organizations have been the recipients of many expressions of good will on the part of civic bodies throughout the city.

On September 8, the opening date, Dallas newspapers carried an article by John W. Everman, city supervisor, congratulating Henry C. Morris, president of the Dallas Gas Co., on the new building, and on the company's progress during his years of supervision as an executive with the company.

A. G. A. Sessions About to Convene

(Continued from Page 24)

pany delegates will convene on Tuesday and will include the election of company members, election of directors and of the 1932 nominating committee and the resolutions committee.

Section meetings have been staggered on the program so as to free the time of many delegates each day for inspection of the Exhibition. Sections will meet on Tuesday, Wednesday and Thursday at 2 o'clock, the Accounting, Commercial and Technical Sections holding forth on Tuesday, the Industrial Gas and Commercial Sections on Wednesday, and the Technical, Industrial Gas and Accounting on Thursday.

Friday, October 16 will be given over to a meeting of officers of Associations affiliated with the American Gas Association.

THE EXHIBITION

Approximately 230 exhibitors have taken space for what is anticipated to be the largest and most complete exhibit yet staged by the Association. Opening Monday, October 12, the exhibition of appliances and equipment will be open daily during convention week. C. W. Berghorn, director of exhibits, and E. S. Dickey, chairman of the exhibition committee, with committee members have followed through in making the 1931 Exhibition an outstanding one in scope and value to the industry.

The usual high standard for entertainment of delegates and guests is being upheld in the many functions scheduled for the four days. Facilities of the Seaview Golf Club are placed at the disposal of the Association from Monday, October 12 to Friday, October 16, including the golf course, putting greens, tennis courts and card rooms. Arrangements have also been made with the Atlantic City Country Club for members to enjoy golfing privileges there during convention week.

Tuesday night the President's Reception will be held, followed by dancing with music furnished by Phil Spitalny's orchestra. On Wednesday a ladies' Luncheon will be held at Seaview Golf Club.

Wednesday night a concert featuring N.B.C. artists will be given, followed by presentation of medals and awards by the Association. A portion of this program will be broadcast over the national network.

"A Night in Hawaii" featuring South Sea Islanders and music by Phil Spitalny's orchestra will be the *piece de resistance* for Thursday night, followed by dancing until 1 A.M.

Air Conditioning by Gas in Dallas

(Continued from Page 33)

has been about 800 cubic feet of 1000 B.t.u. gas per hour.

The system is the up-feed type in which air is supplied through grilles near the floor and exhausted through exhaust grilles in the ceiling. Tests have shown less than 1°F., variation in temperature between the floor and 10 feet above, proving that there is a "blanket" of uniformly conditioned air up past the breathing line.

The same inlet and exhaust grills will be used in heating weather, the only change in the plant being the substitution of steam in the coils of the main cooler for the cold water. Since heating requirements will call for the addition of moisture to the air instead of adsorption a steam nozzle in the air flow will replace the Silica Gel dehydration plant. The quality of steam injected will be controlled by the same humidity controller that controls the "Bone-dry" air damper. This may be set for any desired humidity.

Competitive Gas Sales Factors

(Continued from Page 28)

nas shown steady increases since the first full year of natural gas. Commercial M.c.f. sales per customer have been consistently increased each year. The average rate for commercial gas in Denver is 66.7c per M.c.f. (830 B.t.u.)

The major industrial gas load of Denver is ceramic plants, virtually every type of ware being produced from various gas-fired kilns. This includes sewer pipe. drain tile, hollow tile, fire brick, building brick, refractory shapes, terra cotta, roofing tile, clay crucibles, scientific porcelain, kitchen crockery, tableware, ornamental pottery and flower pots.

Major commercial space heating installations include 604 stores, office buildings, apartment houses, warehouses, etc.

There may be consolation or temporary security in the thought that conditions affecting the sale of gas change but slowly, that forces of competition advance but gradually. Such apathy can be but detrimental, ultimately, to our business. We are concerned with the problem of making daily, monthly and yearly increases in sales by extending the usefulness of our commodity, through its ability to perform a service in a more satisfactory manner at a price the user can economically afford to pay.

Missouri Valley Pipe Line Co. Co. Gets Wymore Franchise

Missouri Valley Pipe Line Co., Omaha, Neb., has been granted a franchise for the service of natural gas in Wymore, Neb. The company has purchased the gas distribution system in town, formerly owned by the United Gas Service Co., Bartlesville, Okla., as well as the system at Blue Springs. Gas service is expected in Wymore within 60 days.

Distributing System at Sioux Falls Getting Ready for Natural

Sioux Falls Gas Co., Sioux Falls, S. D., is actively engaged in construction work looking toward the advent of natural gas service before Thanksgiving time. New lines are being laid and the distribution system used by the company for manufactured gas is being prepared for "natural". Paul Romnaut of Rochester, Minn., has been appointed engineer in charge of the change over work, and Daggett Norwood has assumed the duties of industrial gas engineer.

Basford to Represent Hook Heater in California and Arizona

The Hook Heater Co. of Pittsburgh, Pa., manufacturer of the Hook low pressure steam boiler and automatic valves, has appointed the H. R. Basford Co., 665 Howard St., San Francisco, and 911 S. Grand Ave., Los Angeles, as representative for California and Arizona.

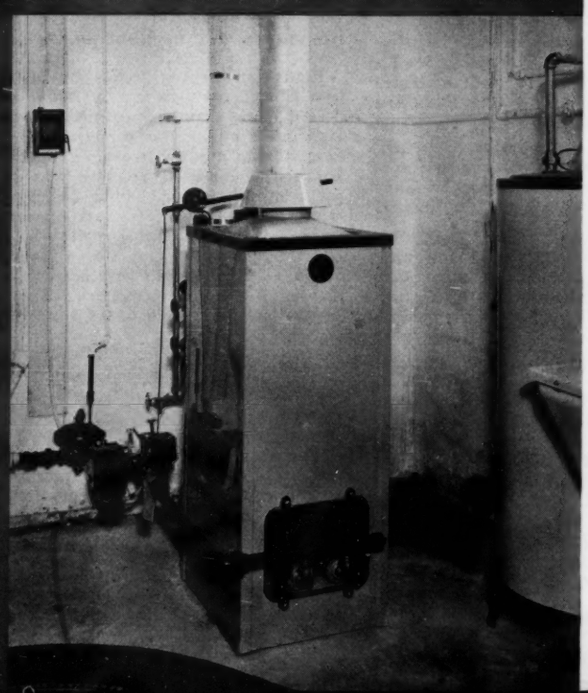
Municipal Election at Newton

Petitions are being circulated at Newton, Kan., asking for the calling of a special election to vote on a proposal to issue bonds with which to install a municipal gas system.

Applies for Strong City Permit

Twin Cities Gas Co., Cottonwood Falls, Kan., has applied for a franchise for the service of natural gas at Strong City, Kan.

1200 IDEAL GAS BOILERS



Mezick Homes, Inc. . . . Rodman & English . . . Long Island Housing Corporation select Ideal Gas Boilers as standard equipment on three projects totaling 1200 Homes.

New York & Queens Gas Company, affiliated with the Consolidated Gas Company of New York, estimates that on the completion of these three projects their load will be increased 252 million cu. ft.

1200 LONG ISLAND HOMES

AMERICAN GAS PRODUCTS CORPORATION

Chrysler Building, New York

A DIVISION OF AMERICAN RADIATOR COMPANY

May Merge Standard Oil Interests

TENTATIVE merger proposals for the union of the Standard Oil Co. of New Jersey and the Standard Oil Co. of California are of particular interest to the gas industry because of the extensive gas operations of the two companies, both from the standpoint of production and the ownership or operation of gas utilities.

Conferences were held during the past month between officials of the two companies looking toward the successful culmination of the merger plans.

The following companies are either wholly or partly owned by Standard Oil Co. of New Jersey:

Hope Natural Gas Co., controlling 829,231 acres of leases and 3,407 producing gas wells in West Virginia. The major part of its business consists of deliveries to subsidiaries operating in Ohio and Pennsylvania, and to certain underlying companies of the Columbia Gas & Electric Corp.

The Reserve Gas Co. also operates in West Virginia. This company transports gas to the Ohio River and there delivers it to the Connecting Gas Co., which carries the gas into central Ohio and sells it wholesale to parts of the system of the Columbia Gas & Electric Corp.

In Pennsylvania the gas received from the Hope Natural Gas Co. is marketed by two subsidiaries, the Peoples Natural Gas Co. and the Columbia Natural Gas Co.

In Ohio the gas is distributed by the East Ohio Gas Co. and the River Gas Co.

The Lycoming Natural Gas Corp. is a wholly owned subsidiary, active in the new fields of Tioga County, Pennsylvania and Southern New York.

The Interstate Natural Gas Co., in which Standard of New Jersey owns a controlling interest, transports gas from the Monroe and Richland fields to New Orleans and Baton Rouge, La.

The company also owns a 42½ per cent interest in the Colorado Interstate Gas Co., transporting gas from Clayton, N. M., to Denver. A 22½ per cent share in the Mississippi River Fuel Corp., operating a 22-inch line from the Monroe and Richland fields to St. Louis, Mo., is another Standard enterprise.

In addition to these properties, Standard Oil of New Jersey owns a one-eighth interest in the pipe line from the Texas Panhandle to Chicago, operated by the Continental Construction Co.

Standard Oil of California owns a one-half interest in the Standard Pacific Gas Line Inc., transporting gas from the Kettleman Hills field to Richmond and other points in northern California.

Pacific Public Service Co., headquartered at San Francisco, also comes under the banner of Standard Oil of California, together with its subsidiaries, among them the following: Coast Counties Gas and Electric Co., Coast Industrial Gas Co., West Side Natural Gas Co. Standard Management and Operating Corp., which controls operations of the Natural Gas Corp. of California, Natural Gas Corp. of Oregon and Natural Gas Corp. of Washington is another Standard of California interest.

Law Affecting Pipe Lines Passed in Texas

R. D. PARKER, chief supervisor of the Railroad Commission of Texas, in a communication to *Western Gas* comment on the recently enacted Texas law affecting common carrier pipe lines, known as the Amendment to the Common Purchaser Act. According to Mr. Parker, the provision of this Act which affects the gas industry chiefly is section 8-A, which creates common purchasers of natural gas and prevents discrimination in the purchase of natural gas under conditions described in the Act. The law does not involve gas transmission lines unless they be purchasers of gas, being directed to the control of purchasers only. Section 8-A of the Amendment to the Common Purchaser Act reads as follows:

"Creating Common Purchasers of Natural Gas and Preventing Discrimination in Purchases. That in order to further conserve the natural gas resources of this State every person, association or persons, joint stock company, limited co-partnership, partnership, corporation, gas pipe line company or gas purchaser now, or hereafter, claiming or exercising the right to carry or transport natural gas by pipe line, or pipe lines, for hire, compensation or otherwise within the limits of this State, or which is now engaged or shall hereafter engage in the business of purchasing, or taking, natural gas, or residue gas or casinghead gas shall be a common purchaser thereof, and shall purchase, or take, such gas under such rules or regulations as may be prescribed by the Commission, in the same manner, under the same inhibitions against discriminations and subject to the same provisions as are herein set out with respect to common purchasers of oil."

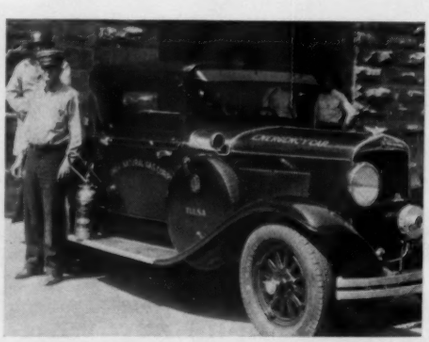
The Railroad Commission called a hearing for September 28 to consider the adoption of rules and regulations regarding the purchasing of natural gas as provided in the Act.

Oklahoma Natural Now Has Car Equipped for Public Service

Oklahoma Natural Gas Corp., Tulsa, has equipped an automobile to respond to all fire alarms or other emergencies, and to aid in fighting flames or give first-aid treatment to those injured or suffocated.

Suggestions made by R. E. Pitts, city fire chief, were followed in equipping the car. It will carry a fire extinguisher, an oxygen inhalator, gas masks and all kinds of first aid accessories. It is painted a bright red and carries a regulation siren.

Two men chosen from the company's first aid team will operate the car and its services will be available day or night.



Oklahoma Natural Gas Corp.'s fire car recently placed in service for public emergency use.

Tri-Utilities System to Remain Intact in Reorganization

Plans for the reorganization of Tri-Utilities Corp., now in receivership, were expected to be definitely formed by the end of September under the direction of the committee handling the work. Appointment of Hugh M. Morris as receiver was announced early in September. It is believed that it is the plan to preserve all operating subsidiaries intact. Subsidiaries include the American Natural Gas Co., Oklahoma Natural Gas Corp., Southern Natural Gas Corp., Kansas Public Service Corp., Texas Public Service Corp., Arizona Edison Co., and others.

Southern Fuel's 26-inch Line Three Weeks Ahead of Schedule

The 210-mile, 26-inch gas transmission line being constructed by Southern Fuel Co., Los Angeles, Calif., will be completed by October 10, three weeks ahead of schedule.

This carrier which takes gas from Kettleman Hills field to Long Beach and Los Angeles, traverses some of California's most rugged mountain territory and represents many difficult construction problems. Approximately $7,000,000 is being spent on the development, which is a cooperative interest of the Southern California Gas Co. and the Southern California Edison Co., Ltd., both headquartered at Los Angeles, Calif.

Electrolux Offers New Plan of Dealer Helps for Winter Selling

Electrolux Refrigerator Sales, Inc., announces the publication of a new plan to be used as a help in producing sales of gas refrigerators during the fall and winter months. The book is known as "Plan C," and deals with problems of fall and winter selling, outlining a definite plan for display and other types of advertising. Copies may be obtained by addressing Electrolux Refrigerator Sales, Inc., Evansville, Ind.

Four Louisiana Towns on List of Natural Gas Users

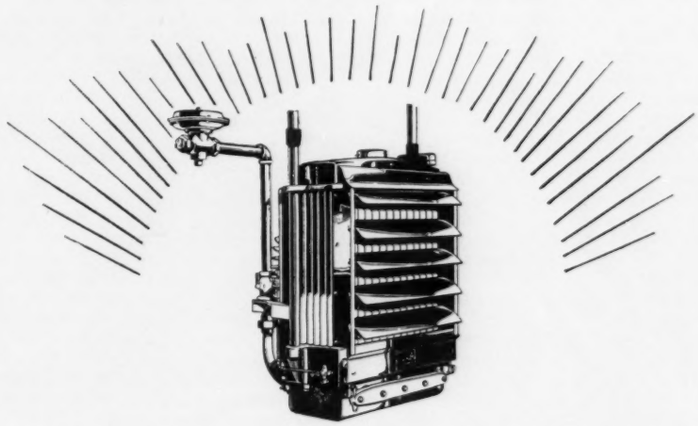
Distribution systems in Covington, Hammond, Ponchatoula and Slidell, La., were completed recently by construction crews of the Louisiana Power & Light Co., with operating headquarters at Algiers, La. Supply for the towns comes from an extension of United Gas Corp.'s Bogalusa line.

June 1, 1932, Given as Date for Beginning Construction on Bivens Line

According to an announcement from C. E. Bivens, president of the Red Feather Oil Co., Denver, Colo., construction on the 133-mile line from the Baggs field to Laramie will start about June 1, 1932. The line will supply gas to Rawlins, Laramie, Saratoga and Rock River.

Like Politics and War, The Humphrey Makes Strange Bed-Fellows

PAPER - MACARONI - SILKS - ENVELOPES - FILMS



GAS UNIT HEATERS

FIND MANY AND VARIED USES

Even the consumers are finding new uses for the Humphrey Gas Unit Heater. As a compact scientific unit for the heating requirements of stores, garages, churches, schools and theatres, it has won widespread recognition.

HUMPHREY GAS UNIT HEATER

And now we find it doing duty as a dryer and dehydrator as well, in a macaroni plant,—for a paper house,—with an envelope manufacturer. In other industries it is drying silks and films.

This is a valuable load,—year round and independent of the heating season. Alert salesmen will easily spot other sales opportunities where a motor driven fan in combination with heating elements can handle special job requirements.

Made in three sizes, with 60,000, 100,000 and 200,000 B.t.u. input rating, there is one Humphrey model adapted to any job you may encounter.

General Gas Light Company
Kalamazoo, Michigan

C. B. Babcock, Pacific Coast Manager
135 Bluxome Street San Francisco

A HUMPHREY PRODUCT

Fundamentals of a Heating Sales Program

(*Continued from Page 36*)

refrigeration industry, for example, it is reported that at the present time nearly two-thirds of the sales volume is on long terms, approaching three years in most cases. In the sale of gas heating installations, therefore, it is necessary that liberal terms be carefully studied if we are to meet this competition with other industries. The finance companies that underwrite term payment sales have not as yet participated to any great extent with the gas heating industry in making liberal terms possible; but they are reported to be quite interested in working to this end with active heating dealers, providing the gas company's sales terms carry the standard finance charge. While it might be said that a gas company could campaign heating sales with the necessary liberal terms, this is not the answer to this problem; because it is unsound for any gas company to give terms that a legitimate dealer cannot, likewise, extend on the same type of sales.

Summer Sales

Intensive summer selling campaigns on gas heating are highly desirable, but have presented an awkward sales problem due to the season of the year. Based upon 1930 sales experience, a campaign was organized in northern California this summer which was participated in by active heating dealers and the gas company. This featured a small down payment with October 1 dating on the unpaid balance, at which time liberal terms were extended over a period as high as 18 months. In addition, as an inducement to consumers to buy during the summer, a special discount of approximately 10 per cent was offered. This campaign, with two months passed, has had a good measure of success, in spite of the economic conditions prevailing this year. The gas heating industry must realize that, if gas heating equipment isn't sold to many prospects during spring and summer months, these prospects will contract during this period for their supply of fuel for the coming heating season; and, having done this, it is not likely that they could be sold gas heating equipment when the fall heating season sales drive is made. Furthermore, summer heating sales campaigns equalize the overhead and aid in the problem of maintaining heating sales and installation crews.

Conversion Burners

It is appreciated that the manufacturers and dealers of gas heating equipment are quite naturally concerned about the gas company's activity in the sale of conversion burners in those localities where they are being campaigned. In northern California the sale of conversion burners has served as a means of introducing on an extensive scale the idea of natural gas heating; and, as such, has been the background of a large volume of gas furnace sales. Since the gas conversion burner with thermostat control modernized old wood and coal furnaces, the sale of such furnaces has been supplanted. A popular demand was, therefore, created for gas, with the result that it has been possible for the dealers to sell almost all of their new new jobs with gas furnaces instead of competing fuels.

One feature of the conversion burner selling in northerin California was that of having one price for all sizes of domestic installations, thus relieving the salesman or the buyer from the necessity of discussing what size burner would be installed. The installation department selected the correct size burner for a proper installation. The outstanding merchandising feature of the campaign was that of selling with a small down payment and fixed monthly payment—such as $10 down and $5 a month. During the spring and summer months, by featuring fall dating it was possible to maintain a fairly uniform volume of sales. The success had in merchandising the sale of conversion burners indicates that if it were possible to sell gas heating appliances at a price which included the installation cost for average conditions and make such sales on the basis of say $10 down and $5 a month, it goes without saying that a larger volume of business could be done. It is likely that this idea could only be applied to certain types of appliances —inasmuch as many gas heating installations represent tailor-made jobs—and it is impossible to advertise a total price that includes a fair average installation charge. Nevertheless, one of the problems in the sale of gas heating equipment is the necessity of simple selling prices which can be effectively advertised for a complete installation.

The sale of gas heating equipment cannot be viewed solely from the standpoint of the gas company. The natural and logical outlet for the sale of heating equipment in the average city is the heating contractor or heating dealer. The volume of heating equipment that he sells, whether it use gas or competing fuels, usually dominates the heating business. It is, therefore, desirable where possible to have the active dealers or heating contractors realize that it is to their advantage to sell *gas* heating equipment. If a gas company can enlist their participation, the combined sales of the heating dealers and the gas company may then reach a considerable volume. In the average community it is quite likely that the sale of gas heating appliances by the gas company represents more than one-fourth of the heating equipment sold in that community. In northern California, prior to the advent of natural gas, a year and a half ago, nearly 90 per cent of all the furnaces sold did not burn gas. At the present time, the trend shows that approximately 90 per cent of all the heating equipment being sold in northern California is for gas fuel and that over three-fourths of this volume is being sold by the heating dealers. To make such a condition possible, it is necessary, of course, that the gas company realize the importance of maintaining its advertising and sales activity upon a constructive, creative basis and that it's sales policies be based upon the maintenance of price, the adherence to proper standards and use of reasonable selling terms.

The various problems of gas heating sales, as previously stated, are problems of the gas heating industry as a whole. There is yet much to be done to coordinate the selling effort of dealers, manufacturers and gas companies. It appears that in any extensive sales program, it is important that the gas company be a leader and take an active part in direct selling upon a constructive basis. The answer to all of the issues involved, however, is dependent upon local conditions; but, in any event, each problem is an equal responsibility of the different groups comprising the gas industry.

Why Not Buy Pipe Line Protection?

(*Continued from Page 38*)

unsatisfactory service unless a very considerable amount of time and care is given to their application. Poor application and partial protection may sometimes be better than no protection, but there are data indicating that under certain conditions coating failures accelerate corrosion. It is advisable, therefore, at least to consider complete protection.

The purchase of pipe line protection rather than coating materials seems difficult, because it brings into prominence those features of pipe line protection—the hazard involved and the necessity for proper application—which are frequently given little consideration when a decision to purchase protective coating materials is made. The objections to purchasing protection are really objections to protective coatings, made more evident because the responsibility for the protection would be fixed.

Summary

The principle involved in the suggestion that the owner of a line should purchase protection is that it is logical and economical to purchase directly whatever is required. The purchaser will in this way know what he is to receive and what it will cost. The application of coatings by specialists will result in economy of time and materials.

The adoption of the suggested plan will insure better protective coatings, because it will fix the responsibility for coating failures and stimulate manufacturers and contractors to study soil action and coating performance. The requirement of a guarantee of performance will tend to eliminate incompetent manufacturers and contractors, and benefit those who can furnish real service. The idea is not applicable to all lines and conditions, but is worth consideration whenever the owner of a pipe line really wishes to know what he will get for the money he has to spend for protective coating.

1931 Calendar

October

American Gas Association — 13th Annual Convention, Atlantic City, October 12-16, 1931.

20th Annual Safety Congress and Exposition—Chicago, Ill., October 12-16, 1931.

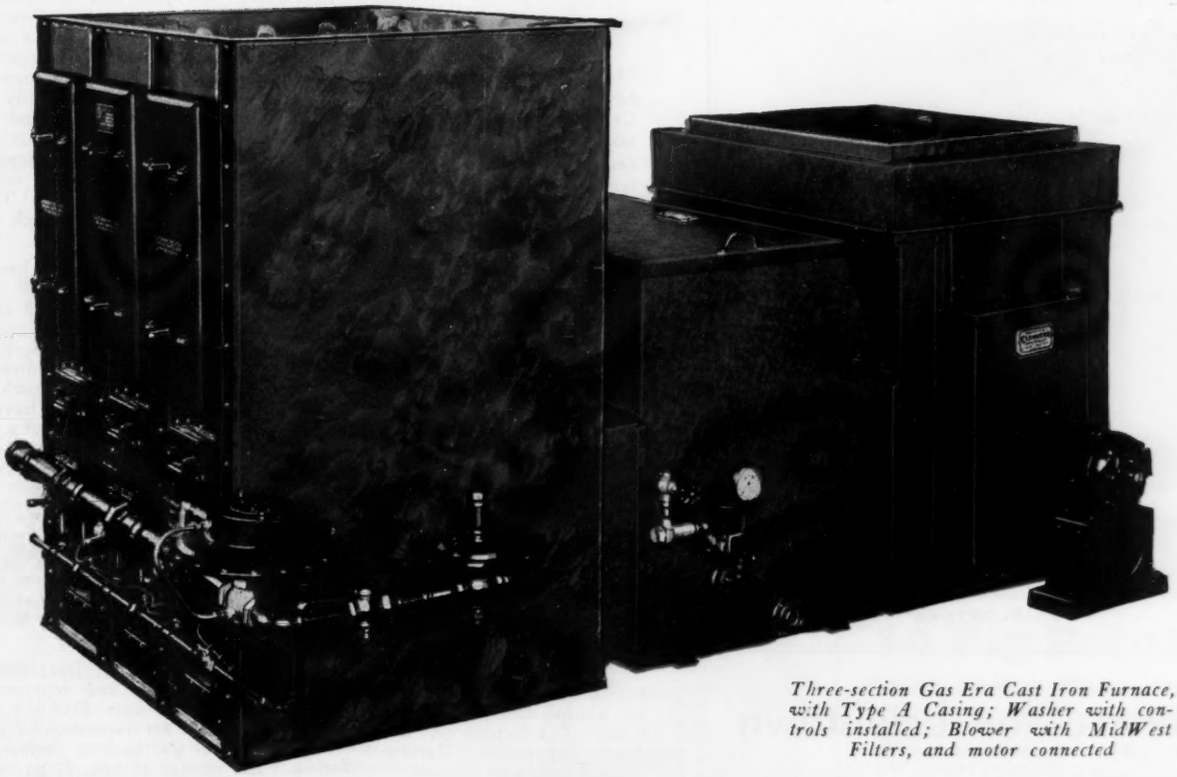
Southern California Meter Association—October 22, 1931.

November

Northwest Oil and Gas Association—Seattle, Wash., November 6-7, 1931.

American Petroleum Institute—Chicago, Ill., November 10-12, 1931.

Third Annual Conference on Bituminous Coal—Pittsburgh, Pa., November 16-21, 1931.



Three-section Gas Era Cast Iron Furnace, with Type A Casing; Washer with controls installed; Blower with MidWest Filters, and motor connected

here it is...

MUELLER-STURTEVANT CLIMATOR AIR CONDITIONING EQUIPMENT *for Home Installations*

If you attended the Pacific Coast Gas Association convention at San Francisco, you no doubt saw and inspected the Climator unit illustrated above. Wherever shown, the Mueller-Sturtevant Climator has received a most enthusiastic reception.

The Climator brings within the range of the average home owner, equipment that compares favorably in results with the finest, most efficient large capacity installations. Gas-fired, electrically operated . . . assuring the maximum of automatic convenience, cleanliness and year-'round comfort.

Descriptive literature and details on request.

L. J. MUELLER FURNACE CO.

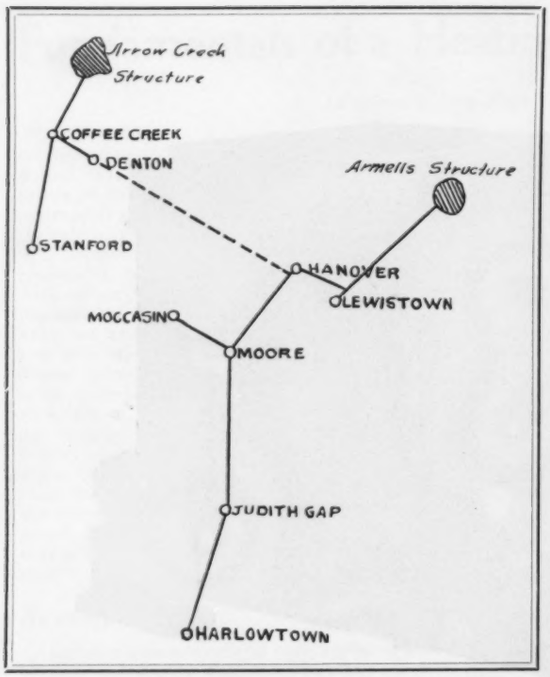
334 So. Second St. Milwaukee, Wis.

See the
MUELLER
EXHIBIT
at the
A. G. A. CONVENTION

Atlantic City, October 12-16

Display includes Mueller-Sturtevant Climator, Mueller Gas Era gas-fired pressed steel and cast warm air furnaces, gas-fired steam and hot water boilers, for practically every type of installation.

BOOTH 326



Sketch showing route of Lewistown Natural Gas Co.'s line from the Armells field to Lewistown, and other central Montana towns, and the system extending from the Arrow Creek structure to Coffee Creek, Denton and Stanford.

Service for Lewistown

LEWISTOWN Natural Gas Co., Lewistown, Mont., announces that the contract for building the 6- and 4-inch gas transmission line from the Armells Structure to Lewistown, Hanover, Moccasin, Moore, Judith Gap and Harlowtown, has been let to the Skaggs Construction Co., Fort Worth, Texas. Construction was begun in September, with the expectation of serving the market before winter sets in.

According to plans announced by the Communities Gas Service Corp., Dallas, Texas, the Lewistown enterprise will be taken over from C. O. Moore when the system is complete and in operation, and will operate in the name of Montana Communities Gas Co., headquartered at Lewistown. The line from the Armells structure to Lewistown and Hanover will be approximately 75 miles long, of 6-inch pipe, and from Hanover to Harlowtown, 4-inch will be used.

Another development in the area with which the Moore interests are connected is a line from the Arrow Creek Structure to Coffee Creek, Denton and Stanford. Possibility of the connection of these two systems between Denton and Hanover is also mentioned. About 30 miles of pipe will be laid for the Arrow Creek-Stanford carrier.

No. California Bakery Oven Conversions

(Continued from Page 29)

In each case the change to natural gas has brought comment to the effect that natural gas has been found economical, easy to use, and helpful in keeping the bake shop immaculately clean.

In Table No. 1 are listed some statistical results on monthly costs before and after the conversion to gas:

Of course, there are also plants in which no direct saving is shown, but where the improved conditions brought about by conversion to gas justify the retention of the job by the consumer. When too large a differential is shown in favor of the previous fuel, it can usually be attributed to poor operating and combustion conditions. Every effort is made to make necessary tests and adjustments to bring down this cost differential. Usually two or three contacts with the consumer made for educational purposes and the submitting of test results showing how improvements can be made bring the costs into line and keep gas on the job.

In making combustion tests it has been found that usually the damper settings for suitable combustion with oil are not proper for good combustion with gas; for instance, in using a blast type burner on a direct-fired oven sufficient air for combustion is easily obtained even with the dampers closed halfway.

TABLE NO. 1

Plant No.	*Number of Ovens*	*Previous Fuel Cost*		*Present Gas Cost*
		Oil	*Gas*	
1	1	$20		$ 19.50
2	2	70	$10	63.20
3	1	27	12	36.00
4	1	32	12	31.00
5	2	100	20	125.00
6	1	40	50	89.00
7	2	40	20	58.00 to 60.00
8		50	10	60.00

In placing new jobs into operation it is extremely desirable to carefully follow up the job during the first week or 10 days in order to make sure that the operators properly understand gas firing. Some salesmen have found it very helpful to take daily meter readings for the first few weeks and advise the baker of his daily fuel consumption. In this way his helpful cooperation is obtained and the bill will be within the estimated amount and the consumer satisfied. The bill can easily go up 50 per cent through neglect of these essential matters.

Quite a variety of burners have been used to make conversions. Direct-fired Dutch ovens require a blast type of burner in order that all parts of the oven may be uniformly heated by directing the long flame into the various parts of the oven. Indirect-fired Dutch ovens or continuous-fired Dutch ovens, as some oven builders prefer to have them called, can be heated efficiently with atmospheric types of burners. Rotary and revolving reel ovens can also be suitably fired with atmospheric types of burners.

In the data given above on the number of conversions made in northern California, the largest number were direct-fired Dutch ovens, the next largest number were indirect or continuous-fired Dutch ovens and the balance made up of rotary ovens and other types.

The 388 ovens, more or less, still being fired with other fuels, and representing a potential revenue of over $100,000 a year, offer a large field for expansion of this desirable industrial gas load in northern California. The change to natural gas will result in improved conditions for and increased satisfaction to the baking industry.

The progress already made with this load, plus the fact that the supply of natural gas for northern California is assured both by large reserves in the field and adequate transmission systems into the northern California territory, makes it readily seen that within a few years a major portion of the bakery fuel requirements of this area will be filled with natural gas service.

Western Service Corp. Files Rate Schedule for Oklahoma Towns

Western Service Corp., Oklahoma City, Okla., announces that the following gas rate schedules have been filed with the state corporation commission, applicable in Shawnee, Guthrie and rural communities:

First 50 M.c.f., 44c per M.; next 25 M.c.f., 35c per M.; next 25 M.c.f., 25c per M.; next 1,900 M.c.f., 13c per M.; next 2,000 M.c.f., 12c per M.; next 6,000 M.c.f., 11c per M.; all in excess of 10,000 M.c.f., 10c per M. If 25,000 M.c.f. are used in any one month the whole bill is to be figured at 9c per M.c.f.

Peabody Gas & Service Co. Moves Offices to New Location

The Peabody Gas & Service Co., Peabody, Kan., announces the removal of its office on September 3 to a new location. The building has been renovated, repaired and redecorated.

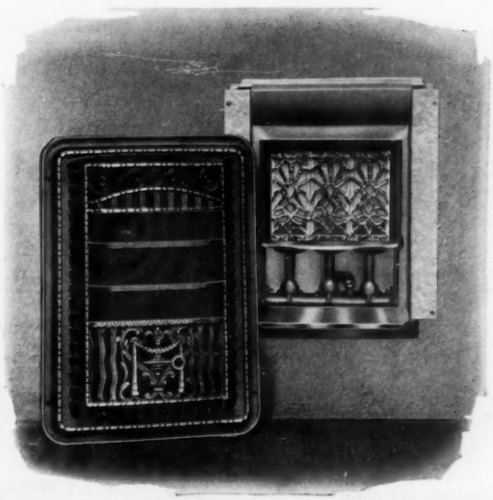
Converting Court House to "Natural"

The Greene County court house in Springfield, Mo., is being changed over from coal to natural gas service by the Springfield Gas and Electric Co., a Gas Service Co. affiliate.

Grille Changed

In 2 Minutes . . .

Without Removing Heater



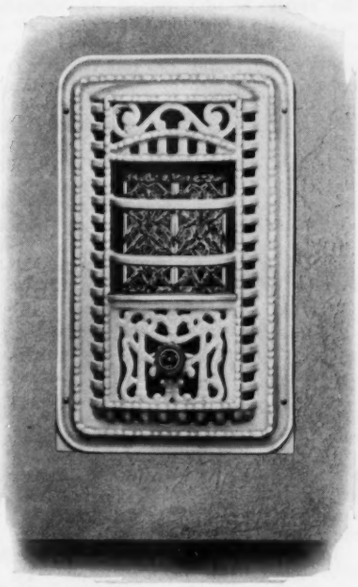
The Improved

PACIFIC GAS WALL HEATER

Cuts Installation Costs and Eliminates Installation Griefs

Pacific Gas presents an improved Pacific Gas Wall Heater which cuts installation costs, eliminates installation griefs, simplifies servicing, speeds up sales. The removable grille does it. The grille is changed in 2 minutes without removing heater from wall. Heater comes with grille detached for easy installation. Labor of installation is less; certainty of accurate installation is greater; results are 100% satisfactory to you and to the owner. The removable grille, with all of its important advantages, is an exclusive Pacific Gas feature.

The new Pacific Gas Heater is serviced, cleaned, adjusted without removing from wall. By loosening four screws the grille is removed for cleaning, refinishing, repair, or exchange. With grille removed, gas connections, burners, and other simple parts are instantly accessible. The housing for radiants is of durable cast iron. Once properly installed, it need never come out. All the muss and fuss once associated with servicing or repairing a wall heater is gone forever. It is economically priced and will provide you a satisfactory profit. It will sell on its merits to any home, hotel, apartment house or bungalow court, where wall heating is practical. Because of ease and economy of installation it is an ideal replacement item. Attractive consumer folders and other selling helps are now ready. Write, wire, or phone today for full details. Feature the New Pacific Gas Wall Heater as a sales leader for Fall.



TWO STANDARD SIZES; A FINISH AND A COLOR TO SUIT EVERY ROOM

The new Pacific Gas Wall Heater is furnished in two standard sizes; No. 66 for bathrooms and other small spaces; No. 88, for rooms of standard size. It comes in four electroplated metal finishes: Antique, Bronze, Copper, Nickel, and in porcelain enamel in a series of colors to suit any room.

10 Big Points

That Make This New Wall Heater Better

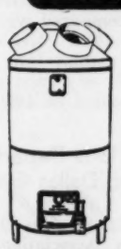
1. Uses no floor space . . . an important feature in small rooms.
2. Clean, odorless, wholesome heat. Cheerful, comfortable warmth.
3. Extreme simplicity of operation. No adjustable air mixers to fuss with; nothing to get out of order or for children to tamper with.
4. Experienced and expert care in construction, plus the conscientious skill upon which Pacific Gas Radiator Company has built its reputation as the oldest and largest organization of its kind in the West.
5. The famous Pacific Multi-Tubular Burner, an exclusive feature. Easy to clean.
6. Fire box, cabinet and front of solid cast iron. Outer frame of heavy sheet iron, insulated with asbestos.
7. Pacific high quality long-lived fire clay heating elements, finished in polychrome colors.
8. Every unit quickly accessible and easily replaced.
9. Pacific efficiency and economy, proved by more than 200,000 gas heating installations, giving maximum heat from minimum of fuel.
10. Guaranteed by Pacific Gas Radiator Company to be free from all defects of material and workmanship and to give absolutely satisfactory service.

Pacific Gas Radiator

Gas Heating **Company** *Headquarters*

Roseberry and Walter Streets
Huntington Park California

Gas-Steam Radiators



Round Furnaces

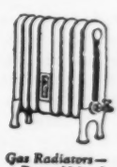
Dual Pipeless Furnaces

Fireplace Radiant Heaters

Recess Radiant Wall Heaters

Automatic Storage Hot Water Heaters

Pipeless Floor Furnaces



Gas Radiators—Pressed Metal and Cast Iron

Agencies Throughout the West

Call for a Pacific Heating Engineer

MANUFACTURERS *of* EVERY TYPE *of* GAS HEATING APPLIANCE

TABLE NO. 1. A GUIDE TO THE PROPER SPACING OF BROAD BASE TERRACES.

When the Slope of the Land in 100 ft. is	Give a Vertical Fall Between Terraces of	Distances Between Terraces will then be about
1 ft.	1 ft. 9 in.	175 ft.
2 ft.	2 ft. 6 in.	125 ft.
2 ft. 6 in.	2 ft. 9 in.	110 ft.
3 ft.	3 ft.	100 ft.
4 ft.	3 ft. 4 in.	80 ft.
5 ft.	3 ft. 6 in.	70 ft.
6 ft.	3 ft. 7 in.	60 ft.
7 ft	3 ft 10 in.	55 ft.
8 ft.	4 ft.	50 ft.
9 ft.	4 ft. 6 in.	50 ft.
10 ft.	5 ft.	50 ft.

Terracing to Prevent Soil Erosion

(Continued from Page 31)

1. Size up the area.

2. Find the high point of the area and measure the slope.

3. Consult the guide table that is printed in this article and decide upon the vertical fall.

4. Run a trial terrace line.

These are highly important steps, especially for beginners in the work, and if followed with care in the order in which they are given, they will lead in most cases to a successful job of terracing.

Step No. 1. The first thing to be done in terracing a piece of land is to learn everything possible about the conditions present. The land's drainage with relation to surrounding fields should be considered. Water coming from unterraced land above must be cared for. If necessary such water may be diverted by means of a levee or ditch, or combination of both. Sometimes a definite starting plan for terracing the whole farm will avoid the necessity of changing terraces built without regard to the over-all needs of the farm.

The general direction of flow in main streams will indicate this general slope. When possible, terraces should discharge water opposite to the direction of flow in main streams. The type of surface soil present, the number and size of gullies, the sub-soil and the probable length of the terrace lines should all be taken into consideration when planning a system of terraces. In sizing up the area one main factor is the location of terrace outlets, which should be given careful thought, because if they are improperly located the discharged water may cause the landowner trouble with neighbors, the county commissioner, or the State Highway Department.

Step No. 2. In planning the terrace system, the logical place to start is from the high point of the water shed or catchment area. The location of the first terrace and every succeeding terrace should not be a matter for arbitrary decision. The natural slope of the land, the ability of the soil to absorb moisture and the water shed or catchment area presented to each terrace, should determine their location. On cultivated lands water becomes a destructive force when it has quantity or speed or both. A terrace system is designed to cut down quantity and speed of water on the area.

When planning the terrace system we should remember that it is not the ordinary rain we are fighting; it is the extraordinary rain that does great damage. Water is such an immense force that every advantage possible to man in combatting it should be made use of.

It is a real advantage to put the top terrace high up on the slope. To locate the first terrace, set the level up at a point on the slope from which the highest point of the water shed can be overlooked. (Note): The instruments spoken of here are the standard level and rod for terracing purposes.) The level is not set on the high point which is the location for the rod. The highest point can easily be determined by sighting the target in line with the horizontal hair of the telescope up the slope on the rod. The high points being found, the rod reading is noted and the rod moved down hill 100 feet along the line of average slope, when the target is again sighted in line and the rod reading noted. The difference between the two readings will be the fall or natural slope of the ground in 100 feet. We cannot always determine the line of average slope by observation. It then becomes necessary to measure in two or more places, add the difference obtained, and divide by the number of measurements taken to obtain the average slope.

Step. No. 3. Knowing the natural slope of the ground, Table No. 1 should be consulted. This table is intended to serve as a guide, but it does not fit every case. The individual's experience in terracing, his farm sense, good judgment and knowledge of his soil should be consulted along with the table.

With the high point of the area to be terraced known, and also the natural slope of the field in 100 feet, the vertical spacing for the terrace is determined with the guide table.

In effect, the table advises a definite vertical spacing for definite slope. To obtain the spacing the instrument is set up near where the upper end of the terrace will come and overlooking the high point on which the rod reading is taken to the high point reading add the vertical fall indicated by the guide table, set the target on the rod at the sum of the two and proceed to find the location of the upper end of the terrace. When the high point is found then the terrace line is run, the target being raised on the rod to give the amount of grade decided on, and the rodman moves 50 feet or 100 feet as the case may be, to what he thinks will be the next point on the terrace line, when the instrument man again motions him up or down the hill until on the line of the terrace. This process is repeated until the line is completed to the outlet with the proper grade given.

Step No. 4. Running the terrace line. At least two men are necessary for this work, one man with the leveling instrument and one man with the rod. The rodman should also carry a hoe with which to mark the points on the terrace line as they are determined, by raising a mound of dirt at each point. If stakes are necessary to mark the terrace line a third man must be used to carry and set the stakes.

It has often been said that the rodman builds the terraces, and much depends upon the rodman's good judgment. He is responsible for the correct grade of the terrace and should exercise care when holding the rod to be sighted upon, avoiding uneven spots in the ground surface. When working to such small grades as two or three inches in 100 feet errors can easily occur which would defeat the purpose of the work.

This completes the general fundamentals of locating and running the terraces except as concerns the grade of the terrace, and that depends upon the type of soil, how easily it is moved, and its ability to absorb moisture, and upon the length of the terraces. Remember that one object of terracing is to hold as much water in the soil as possible; therefore, slow movement is desirable.

In some parts of Oklahoma the following grade for 1600 feet of terrace has proved satisfactory:

At the upper end,	200 feet	—level
then	200 feet	—1 inch grade
	900 feet	—2 inch grade
	300 feet	—3 inch grade
	1600 feet	2 ft. 5in. total fall

The grade shown above will not be successful on all kinds of soils.

Tahlequah Franchise Holder Drilling for Gas Supply

A drilling campaign for natural gas is being conducted at Tahlequah, Okla., by Tonnes Dennison, a Santa Barbara, Calif., oil man, who was granted a gas franchise in the town on August 24. Mr. Dennison has purchased 600 acres of land four miles west of the city and has started drilling for gas. If the Tahlequah fields fail to produce, Mr. Dennison promises to pipe gas to Tahlequah from the Muskogee area. He has been given one year to establish service.

"Fall Styles" Cooking School Sponsored by Western Gas Co. of Wash.

Western Gas Co. of Washington, Bremerton, Wash., a subsidiary of Public Utility Investment Co., Salina, Kan., conducted a series of cooking classes over a period of three days from September 9 to 12. The "Fall Styles Cooking School," as it was called, was conducted by the company in cooperation with the Daily News-Searchlight and General Foods Corp.

Operating Revenue on Up-Curve For Central Arizona L. & P.

Central Arizona Light & Power Co., Phoenix, Ariz., subsidiary of American Power & Light, reports a gain in net operating revenue of $195,963 for the year ending June 30, 1931, as compared with the 12 months ending June 30, 1930. Net operating earnings for the year ending June 30, 1931, amounted to $1,479,147, as compared with earnings for a similar period of 1930 of $1,283,184.

Natural Gas Department, A. G. A. Moves to Dallas Gas Building

The Natural Gas Department of the American Gas Association has moved its headquarters office from the Allen Building in Dallas to the Dallas Gas Building, recently completed.

When the gas bill arrives—
when they look at the room temperature—
when the weather changes suddenly
while they are away—

then, what do they think about *gas heating?*

As a matter of fact, consumers who have *completely automatic* gas heating plants think about their heating very little at all!

They are sold on gas—*enthusiastic*, when they come to think of it.

And why shouldn't they be? Not a cubic foot more runs through the meter than is needed to keep the house comfortable. House temperatures automatically regulate themselves. When the weather suddenly turns warmer or colder, no one has to hurry home to tend the fire. It tends itself.

To give house owners the *fully automatic* heating they want requires more than a push-button. It takes a certain minimum list of regulator equipment. Minneapolis-Honeywell has worked out this minimum in the popular Q-20 Regulator Set. This set has helped gas companies win thousands of enthusiastic domestic heating converts on the Coast.

Let us help you plan a Q-20 campaign in your locality.

The Popular Q-20 Regulator Set

The minimum control requirements for fully automatic house heating—the Q-20 Regulator set consists of a plain thermostat, a magnetic gas valve of the required size, a specially designed transformer, the necessary length of 3-wire cable and staples.

Minneapolis-Honeywell Regulator Company

CALIFORNIA BRANCH
557 Market Street, San Francisco, California

DISTRIBUTORS
Portland, Seattle, Los Angeles, Salt Lake City, Denver

DISTRIBUTORS

North Coast	Arthur F. Erickson Co. 315 Selling Bldg., Portland, Oregon 816 Terminal Sales Bldg., Seattle, Wash.	*Southern California*	English & Lauer 1224 South Pedro St. Los Angeles, Calif.	*Denver*	Daly Company 1635 Blake St. Denver, Colo.	*Salt Lake City*	Hawley-Richardson-Williams Co. 204 Dooly Bldg. Salt Lake City, Utah

MINNEAPOLIS-HONEYWELL
Automatic Heat Controls

Dealer Cooperative Plan for San Antonio

SAN ANTONIO PUBLIC SERVICE CO., San Antonio, Texas, announces that a new plan of cooperative merchandising has been tentatively worked out between the company and local dealers in gas and electric appliances. The purpose of the plan is to coordinate the efforts of San Antonio Public Service Co. and local appliance dealers with a view of increasing the volume of sales for the dealers and at the same time build additional load for the company.

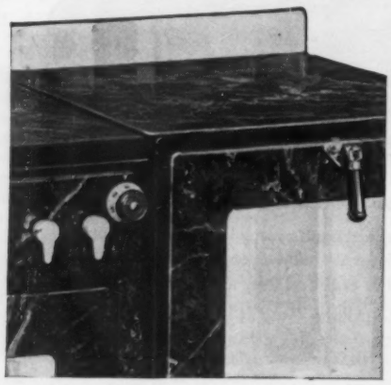
As a preliminary move the company announced the withdrawal from merchandising in San Antonio, although continuing the sale of appliances in the suburban area which its serves.

A feature of the cooperative plan is that the company will make available at its own expense for a trial period, an experienced sales supervisor who will aid in organizing and training salesmen for the dealers, and will render his assistance in preparing sales campaigns. The display in the main office of the company building will be delegated to the use of dealers. This space will be allotted to all dealers of certain standing in an equitable manner, and the time for using such space will be determined by drawing. Under the plan the company display room and display windows will serve as permanent ad-advertising media for dealers. Part of the display room will be used for seasonal exhibits and sales campaigns, the equipment being supplied by the dealers. In addition to furnishing a sales supervisor to contact and assist the dealers, the company will utilize regular space in the daily newspapers, calling attention to the dealers' display and featuring certain merchandise on display. The dealers are not obligated in any way, but may tie in with this advertising if they desire.

The company will continue to maintain a home service department which will be available to dealers for assisting consumers in obtaining satisfactory results in the use of appliances. This department will continue in the work which it has done in the past—demonstration of the proper use of appliances, proper diets, and will give lecture demonstrations at various times.

Milwaukee Gas Specialty Co. Announces Two New Thermolators

MILWAUKEE Gas Specialty Co., Milwaukee, Wis., announces the production of two new Thermolator Models, "F" and "FR", especially designed for table top ranges, being more compact in design than previous models. The new Thermolators are installed on the front of the table-top range, and are supplied completely assembled, ready



to install. They have the laminated metal thermostatic element formed of two nichrome steel alloys, electrically welded. It is stated by the manufacturer that this metal will withstand heat up to 1500° F.

Thermolator Models "F" and "FR" are styled in the modern mode with a variety of dials designed to harmonize with the style and finish of late model table-top ranges. Descriptive literature may be obtained by addressing the company at Milwaukee.

Peoples Natural Gas Co. Opens New District Offices

The Peoples Natural Gas Co., distribution arm of the Northern Natural Gas Co. system, headquartered in Omaha, Neb., established two new Nebraska district offices during September.

Ashland, Neb., will be headquarters for a new district comprising Elmwood, Weeping Water, Louisville and Palmyra.

Wayne, Neb., is now headquarters for Emerson and Wakefield, with F. B. Tracy, representattive of the company, in charge. Mr. Tracy directed the work of redecorating the Jefferies Building in Wayne, getting it ready for the gas company's occupancy.

Branch offices of the company were opened in Wymore and Blue Springs in September with service expected there early in October.

The Peoples Natural Gas Co. secured many franchises in Minnesota during the month, among them Alden, Amboy, Byron, Dodge Center, Janesville, Mantorville, Mapleton, Morristown, New Richland, Belleplaine, Pine Island, St. Peter, Waterville, Wells, West Concord, Zumbrota, Emmons, Hartland, Kasson, Ortonville and Hayfield. Franchise applications were filed in Wabasha, Le Center, New Prague, Shakopee, Chaska. Jordan, Le Sueur, Grand Meadow, Sleepy Eye and Blooming Prairie.

To Move 25 Compressor Units From Wascom to Alto

United Gas Public Service Co., Houston, Texas, announces that it will move 25 units from the Wascom compressor station to the plant at Alto, La., in the Richland area. Gas pressure in the Richland field has dropped from 1,100 to 500 pounds, and the move will increase the capacity of that station to 60,000,000 cubic feet of gas daily. Installation of these units in the Richland field will boost gas to the Interstate Natural Gas Co., Mississippi River Fuel Corp. and the Arkansas-Louisiana Pipe Line Co.

Use of Gas in Northern Calif. Doubles in Two-Year Period

According to a report from the Pacific Gas and Electric Co., San Francisco, the use of gas in northern and central California has more than doubled in the two years since the advent of natural gas in 1929. The company's system delivered more than 13,500,000.000 cubic feet of natural gas in the first six months ending June 30, 1931, as compared with a sendout of 11,500,000,000 cubic feet for a corresponding period in 1929.

More than 800 industrial companies have substituted it for other fuels, and 1,000 office buildings, hotels, apartments, hospitals and other institutions have been changed over. Domestic heating installations in the past two years include 7,000 gas furnaces, 17,000 conversion burners, and 17,000 floor furnaces and other small appliances.

Seattle Gas Co. Wins Advertising Award

IN the recent competition staged by the Seattle Advertising Club in cooperation with three daily newspapers in Seattle, Wash., the Seattle Gas Co. won first place with copy prepared by Paul A. Brattain,

HOT—
HOT WATER
For your personal appearance—for the protecting cleanliness of foods and dishes—for the sanitary washing of clothes—for relief in emergencies day or night...Modern families find hot water economy is in an ample and constant supply whenever needed. Hotzone Selfacting Gas Water Heaters are easy on the purse—learn to know real hot water convenience and you will depend upon Hotzone service to keep the entire household radiating the contented hot water smile of health and happiness.
There is no equal to gas fuel to keep you supplied with constant hot water. We make you a liberal cash allowance for any type of water heater—coil or back to apply on a selfacting gas water heater. We give long terms on low monthly payments. Call us today
SEATTLE GAS COMPANY

advertising manager. This contest is held every year, the awards being given at a meeting of the Advertising Club.

Above is shown a replica of the prize-winning advertisement.

Indianola, Iowa, Being Served from Texas-Chicago Carrier

Natural gas service was begun in Indianola, Iowa, on September 2, service coming from the Continental Construction Corp.'s Texas-Chicago carrier. Iowa Power & Light Co., headquartered at Des Moines, is serving the town.

Wyoming Industrial Institute to Be on Gas Service in October

Wyoming Gas Co., Basin, Wyo., is constructing a line from its Worland system to the Wyoming Industrial Institute 5 miles south. Work is expected to be completed early in October.

Wade Transferred to Blue Rapids

W. E. Wade, manager for Kansas Pipe Line & Gas Co., at Lindsborg, Kan., has been transferred to the Blue Rapids office of the company.

The ROBERTSHAW *Means More to You*

THAN JUST A SELLING IDEA

Consider the position you are in, every time you sell a gas range.

Your customer asks you plenty of questions . . . . and you have to make plenty of promises . . . . as to how that range will perform in day-by-day cooking service.

But when you sell a range that has a Robertshaw, the matter of oven performance is answered and *assured* in advance.

You know that the woman who buys a Robertshaw equipped range is going to be most happy over the meals it cooks for her. You know, too, that she will accept the Robertshaw as a surety that the range is rightly made and strictly up-to-date.

And if you would sell more ranges this season, be sure you know how the Robertshaw advertising and radio campaign is creating new sales and prospects for you.

Write now for the complete Robertshaw program. It costs you nothing, and it does make range selling the easiest part of your work.

"Now she can go where she pleases."

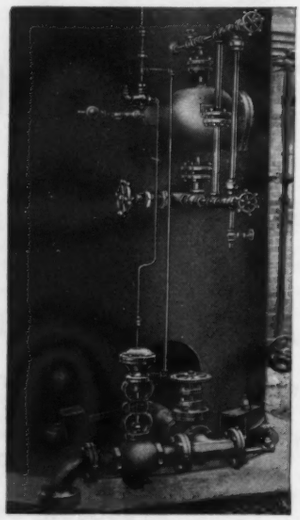
The
ROBERTSHAW
Thermostat Company
YOUNGWOOD · PENNSYLVANIA

ROBERTSHAW
AutomatiCook

NEW!

C-F

Continuous Flow
VIGILANT
Liquid Level
REGULATOR



FOR Towers, Tanks, Stills, etc., for temperatures up to 800 degrees F.—For continuous or intermittent, inlet or outlet flow: This C-F Regulator maintains correct level under any load. A balanced V-Port Valve gives dependable throttling action.

Complete details gladly furnished

The Chaplin-Fulton Mfg. Co.

28-40 Penn Avenue **Pittsburgh, Pa.**

REPRESENTATIVES:

WESTCOTT & GREIS, Inc.
Sales and Service
Dallas — Los Angeles — Tulsa

JNO. W. CRAWFORD
Sales Engineer
1855 Industrial Street Los Angeles

PARSONS ENGINEERING CO.
Los Angeles, Calif. San Francisco, Calif.

Or Any Jobber

We Can Deliver to West and Southwest
Equally as Low in Price as in Middlewest

LUX PURIFYING MATERIAL

MOST ECONOMICAL BECAUSE
MOST EFFICIENT
ALSO LASTS LONGER
QUICK DELIVERY

THE ALPHA-LUX CO., Inc.

192 Front St., New York City. Branches: Philadelphia, Chicago. Storage Base: New Orleans

K. W. Cole to Manage Chicago Office for Pressed Steel Tank Co.

K. W. Cole

PRESSED Steel Tank Co., Milwaukee, Wis., manufacturer of Hackney steel barrels, drums, tanks and cylinders, announces the appointment of K. W. Cole as manager of its Chicago district. The Chicago office is located at 208 South La Salle Street.

Mr. Cole is well known to the industry as a result of his long connection with American La France and Foamite Childs Corp. He attended Cornell University in the College of Engineering.

Western Service Corp. Gets Permit to Operate as Utility in Kansas

The Public Service Commission of Kansas has granted the Western Service Corp., of Oklahoma City, Okla., permission to engage in the retail distribution of gas in Pleasantown, Mound City and Blue Mound, all in Kansas. The company has previously operated only as a pipe line organization in Kansas, taking gas across the state border to Butler, Adrian, Montrose, Deepwater and other towns in Missouri.

Lower Rates Announced for Arkansas Western System

Arkansas Western Gas Co., Fayetteville, Ark., announces a reduction in its rates for natural gas service, to become effective with October consumption. Reduction percentages range from 10 per cent for the first 1000 cubic feet to 28 per cent for larger consumers. This is the third reduction which the company has made since it began operation in 1929.

Reports Progress on Compressor Station Construction

P. E. Fluor, general manager of Fluor Corp., Ltd., has just returned from a mid-continent trip, during which he inspected the progress on the Panhandle-Eastern Pipe Line Co.'s 24-inch carrier. Fluor Corp., Ltd., is now installing its third compressor station on this line. Mr. Fluor reports it will be completed by September 15, 1931.

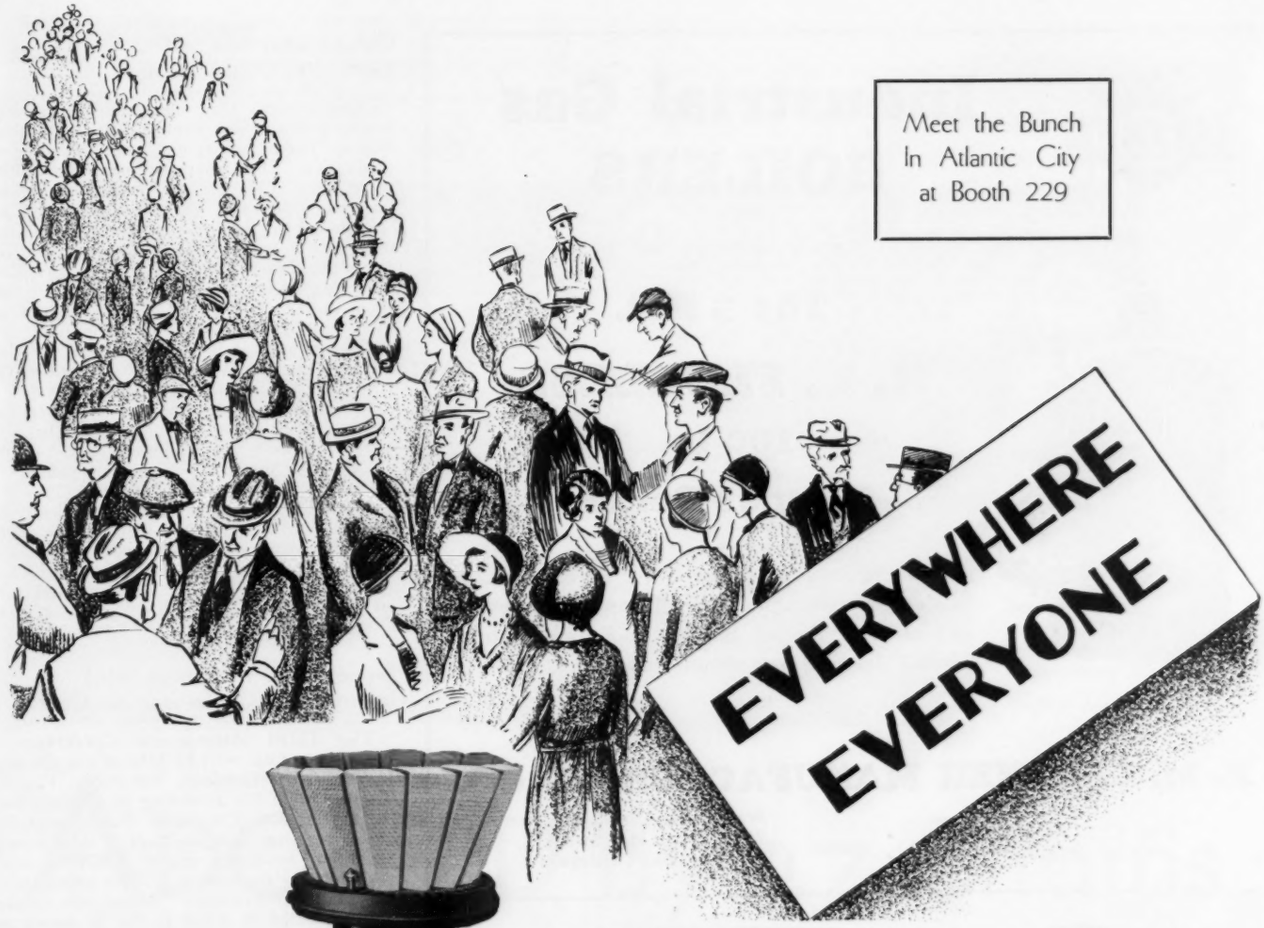
Dry Refrigeration, Inc., Organizes to Manufacture Dry Ice

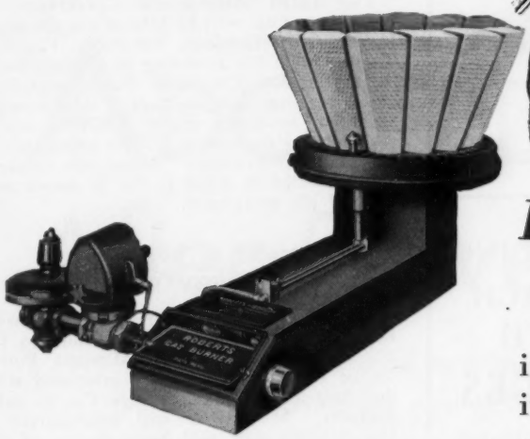
Dry Refrigeration, Inc., is a new California company organized for the purpose of producing carbon dioxide ice as a by-product from operation of a dolomite deposit near San Bernardino, Calif. It is possible, according to report, that natural gas will be piped to the location later, to be used as fuel in manufacturing the CO_2 from dolomite.

Herbert Arndt Added to Sales Staff of Westside Natural

Herbert Arndt has been added as salesman in the Taft territory for Westside Natural Gas Co., according to J. I. McKean, general manager.

Increased sales activities are being promoted by the company, particular stress being laid on water heating at the present time.





Is talking gas for home heating

GAS for home heating is rapidly coming into its own. Everywhere—everyone is talking it.

And therein lies your opportunity. If gas companies are ever to ride on the crest of the wave of popularity for their product—that time has arrived.

Why not take advantage of this opportunity now?

ROBERTS-GORDON
APPLIANCE CORPORATION
CURTISS BLDG. BUFFALO, N. Y.

ROBERTS
CONTROLLED
GAS HEATING UNIT

LATTNER

Industrial Gas BOILERS

The 3 H.P.

H. E. FLUELESS

100 lb.

Lattner Boiler

Available in sizes ¾ to 5 H. P. inclusive. Patented construction with thermal efficiency equal to a tubular boiler. A trouble free boiler for process steam generating.

P. M. LATTNER MANUFACTURING CO.

Factory
516 12th Avenue S. W.
Cedar Rapids, Iowa

Warehouse Distributor
2646 South Hill Street
Los Angeles, California

COMBUSTION EQUIPMENT LEAHY LOS ANGELES CAL. U.S.A.

EFFICIENCY +

THE true value of Leahy Dual Combustion equipment is based on two factors. Its ability to provide efficient economical performance plus insurance against power shutdowns. The first is accomplished by superior workmanship .. materials and construction. The second is due to its fuel flexibility. Leahy Dual Combustion Furnaces burn either gas or oil. In case of one fuel failure, the other may be substituted immediately without loss of time or efficiency Leahy products are backed by thirty years experience on the Pacific Coast.

◆

LEAHY MANUFACTURING CO
Established 1902
1804-1812 East Eighth Street, Los Angeles, California
E. A. CORNELY INC.
1452 Bush Street, San Francisco, California

EACH OUTSTANDING IN ITS FIELD; EACH EQUIPPED WITH MADSEN RANGES

Among the great and good hotels of the West, the St. Francis, in San Francisco; the Santa Barbara Biltmore and the Vista Mar Monte, in Santa Barbara; the Ambassador and the Beverly-Wilshire, in Los Angeles; the Vista del Arroyo, in Pasadena . . . among the hospitals, the Good Samaritan and Cedars of Lebanon, in Los Angeles, and the Los Angeles County Hospital . . . among the clubs, William G. Kerckhoff Hall, U. C. L. A., The Elks, the California and the Jonathan, in Los Angeles . . . among the smart, sophisticated eating places, the Bal Tabarin, in San Francisco; Levy's Tavern, in Hollywood; Victor Hugo's, in Los Angeles . . . among the notable restaurants, Leighton's, Boos Brothers, Herbert's, Pig 'n' Whistle, Simon's Dairy Lunch—each outstanding in its field, and each equipped with Madsen Gas-Fired Ranges in its kitchens. For such universal preference there must be a reason. May we not send details?

MADSEN IRON WORKS, Ltd.

P. O. Box 601, Huntington Park, Calif.
(Suburb of Los Angeles)

San Francisco Factory Representative:
Fred R. Sanford, 631 Second Street

Communities Gas Service Corp. Completes Organization

Communities Gas Service Corp., with headquarters in the Republic Bank Building, Dallas, Texas, has recently completed its organization. The company maintains offices at Kansas City, Mo., Lewistown, Mont., Parsons, Kan., and Vernon, Texas, and has taken over the operation of Northwest Texas Gas Co. and the Kansas Communities Gas Co. The latter company includes the Kansas properties of the organization, among them the St. Paul Gas Co., the McCune gas field, and the Parsons Pipe Line Co.

The corporation has also acquired the right to take over the Montana Communities Gas Co., Lewistown, Mont., when that system is complete and ready to be put into operation. Capital stock of the company is listed as 200,000 shares of preferred and 400,000 shares of common, together valued at $2,000,000.

Following are the officers of the newly organized utility: C. W. Hobson, chairman of the board of directors; C. O. Moore, Dallas, Texas, president; Homer R. Mitchell, vice-president; J. H. Shelton, secretary-treasurer, and C. M. Pierce, assistant treasurer.

Expect 2,000 to Attend Third International Conference on Coal

The Third International Conference on Bituminous Coal will be held at the Carnegie Institute of Technology, Pittsburgh, Pa., November 16 to 21, according to an announcement from Dr. Thomas S. Baker, organizer of the meetings and president of the Carnegie Institute. Seventeen countries will be represented at the conference, and an attendance of over 2,000 is expected. About 100 speakers are scheduled to speak in the 12 major sections of the conference.

John K. Heller to Represent American Cast Iron Pipe Co.

John K. Heller, formerly engineer with Ford, Bacon & Davis at San Francisco for 2½ years, and also with Montana Power Co. of Butte, Mont., is now associated with the American Cast Iron Pipe Co. as sales engineer. Mr. Heller will headquarter at Los Angeles, and will have charge of the Pacific Coast territory of the company, which maintains headquarters at Birmingham, Ala.

Southern Natural Gas Corp.'s July Sales Show Increase

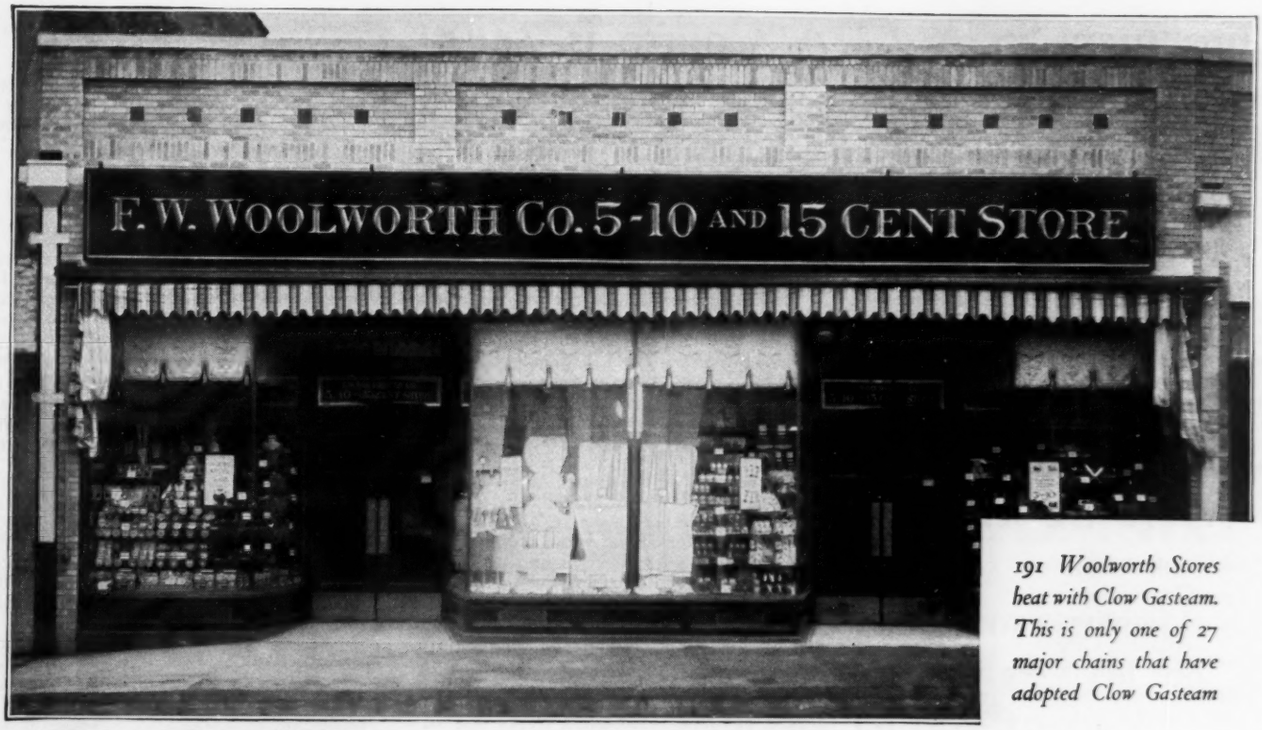
Sales of natural gas by Southern Natural Gas Corp. for the month of July totaled 1,012.626 M.c.f. as compared with 977,231 M.c.f. for the month of June. Industrial sales during the month, which account for the largest part of the total sales on the company's system, showed a distinct upturn in July, being 5 per cent larger than in June.

Goggin Replaces McKee as Auditor for Gas Service Co.

Hugh D. Goggin has been appointed to the auditing staff of the Gas Service Co., Kansas City, Mo., replacing I. W. McKee, who has been made secretary of the Wyandotte County Gas Co., Kansas City, Kan.

Wants to Serve Osage City

American Gas Co., Galena, Kan., is asking for permission to serve natural gas in Osage City, Kan.



191 Woolworth Stores heat with Clow Gasteam. This is only one of 27 major chains that have adopted Clow Gasteam

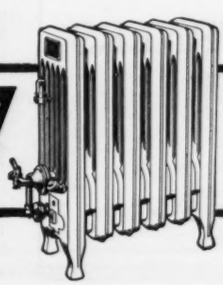
ADOPTED by 27 Chains *After Proved Performance*

Years of carefully recorded experience with all types of heating has resulted in Clow Gasteam being adopted as standard equipment by 27 great retail store chains. Today, thousands of these stores all over the country depend for heat on Clow Gasteam.

Meeting the most rigid requirements, Clow Gasteam has demonstrated its superiority for retail store heating. Actual operating economy, safe, easy operation by inexperienced employees, occupying a minimum of floor space, easy to re-install anywhere, Gasteam is the modern method of heating commercial buildings of all types.

There is an unlimited, profitable market for gas sales easy to reach with Clow Gasteam. And besides, the merchandising profit is unusually large, because practically the entire installed cost of the system is taken up by the radiators themselves.

JAMES B. CLOW & SONS 201-299 N. Talman Avenue, Chicago

CLOW  GASTEAM

Listed by Underwriters Laboratories Approved by A. G. A. Testing Laboratory

Enrollment in A. G. A. Course is 7,000

TOTAL enrollment of public utility employees in the American Gas Association's Employee-Customer Relations Course, as of August 17, was slightly under 7,000, according to an announcement from association headquarters, which states that this is believed to be the largest number of employees ever enrolled in a single industrial course in the United States.

The course was introduced to the industry in October, 1930, and from the start proved to be a highly successful venture. During the 11 intervening months enrollments have been received at the rate of more than 600 a month. Approximately 150 companies have made the course available to their employees. These include manufactured gas, natural gas and combination gas and electric organizations. About 10 per cent of those enrolled are employed in the central station end of the business.

The association's announcement also states that the course has set up a new high figure for completion records, and cites the experience of the Consolidated Gas Electric Light and Power Co., of Baltimore, and the Public Service Electric and Gas Co., of Newark, N. J., in this regard. Of the 644 employees enrolled from the former company, 98 per cent have completed the course successfully and have received their certificates from the A. G. A. The latter company enrolled 702 of its employees. Of this number, seven left the company and every one of the remaining 695 finished the course and received certificates.

The purpose of the course is to build up in contact employees a higher level of skill in handling customer contacts. Six text books are provided for home study and provision is made for the introduction and use of the group conference method of discussion, wherein employees meet under the supervision of fellow-employees who act as leaders and discuss right and wrong contact procedure out of their own experiences. The majority of those enrolled are meter readers, fitters, shopmen, telephone operators, collectors, cashiers, information clerks and secretaries. A period of six months is required to complete the course.

Beginning next month the A. G. A. will enter upon a promotion plan to secure enrollments for the coming fall period. It is anticipated that the enrollment will reach 10,000 before next spring.

We'll be there

13th Annual
Convention
& Exhibition
Atlantic City
Oct. 12th to 16th, 1931

WITH THE PAPICO H & K
& CITY GATE ODORIZERS

Papico is showing a complete line of natural gas odorizing equipment including their Standard H & K and City Gate types. Complete information has been prepared on this latest Papico City Gate Odorizer and it is now ready for distribution. If you have not received your copy write us at once.

PACIFIC PIPE & SUPPLY CO.
1002 Santa Fe Ave.
Los Angeles, Calif.

PAPICO

New Booklet Describes Means to Prevent Corrosion

"Special Protective Coatings for Industry", is the title of a new booklet issued by the Wailes Dove-Hermiston Corp., manufacturer of anti-corrosive coatings for the protection of underground and underwater surfaces and other structures subject to extreme corrosive influences. The booklet contains data for the guidance of engineers and others concerned with the prevention of corrosion in various industrial fields.

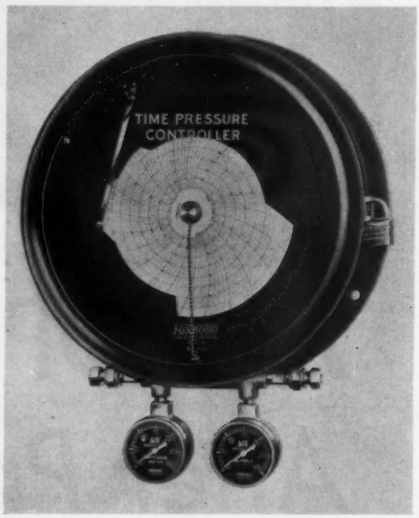
Bulletin 505, as the new brochure is known, is illustrated with photographs showing typical installations which have been protected. It is complete in its classifications, each of which presents to the engineer, purchasing agent or plant executive, the engineering data necessary to explain the types of protection best suited for various kinds of metal structures.

Engineers and others who may wish to obtain copies of the new booklet may write to the company's nearest district office or to general offices of the Wailes Dove-Hermiston Corp., 17 Battery Place, New York City.

Foxboro Company's Non-Recording Time Controller

THE Foxboro Co., of Foxboro, Mass., offers a new instrument for controlling temperature or pressure in relation to time. This instrument, known as the Non-Recording Time Controller, will maintain a predetermined cycle of operation in processes involving temperature or pressure.

The instrument is similar in appearance and construction to the standard Foxboro Recorder-Controller. The major difference between the two instruments is that the



Non-Recorder has a printed aluminum cam instead of a paper chart and a specially designed cam follower in place of the pen arm. This construction has made it possible to obtain a 1 to 1 ratio between the cam reading and control point setting, thus maintaining the control point without the use of multiplying devices.

The cam is a printed aluminum disc the size of a standard Foxboro 10-inch chart. The markings are printed from plates similar to those used in the printing of Humitex Charts. New cams to meet changed conditions can be cut by the user with a pair of shears and a file.

The controller is designed for use on industrial processes in which the relation of time to temperature or pressure is important. One application of this instrument is the maintenance of gas pressures in lines where the load requirements are predetermined. In this application, the controller is used in conjunction with a diaphragm motor lever and controlled valve, to build up or let down the pressure in the line according to previously determined load conditions.

Ramsey Tower Equipped for Gas by Oklahoma Natural

Ramsey Tower, Oklahoma City, is being equipped for natural gas service by the Oklahoma Natural Gas Corp., Tulsa. The building is 32 stories high and the estimated annual consumption is 21,000,000 cubic feet.

FORNEY

COMBINATION GAS and OIL BURNERS

For Power Plant and Industrial Uses

Write for Literature
and List of Installations

FORNEY COMBUSTION ENGINEERING CO.
513 CENTRAL BANK BUILDING, DALLAS, TEXAS

Make More Money with

RAY VITALITE GLO

The Radiant Heaters with the "FIXED" Mix

RAY-GLO is different
in principle, efficiency and CERTAINTY.

Nothing left to chance—
or accident. No variable controls. FIXED MIX.

Hotter flame obtained
by unique burner with patented features.

90% of all air
needed for COMPLETE combustion injected BEFORE combustion begins!

Patented backwall
makes complete combustion POSITIVE—no fumes or odors.

Air-Cooling features
increase the high heat efficiency of burner by THIRTY per cent.

High heat intensity
promoted by special features of radiants and backwall.

Vitalite radiants
emit vital Ultra-Violet rays of sunlight!

No vent required—
90% are operated without.

No need for "service"
whether gas pressure goes way up, or down to a half-ounce!

Manufacturing methods
assure as perfect performance in home as in laboratory tests!

Fully guaranteed
by makers, praised by thousands of users.

Outstanding Values!

Unique Ray-Glo construction never needs adjusting--STOPS that "service calls" expense!

Besides, a special feature makes installation so quick and easy that you are saved real dollars on ordinary labor costs!

Ray-Glo will put your radiant heater business on the right side of your ledger—and keep it there!

THE "COLONIAL"

THE "TEXAN"

There's a Ray-Glo model for every place, and every purse—two of the twenty are pictured. Values challenge comparison. We furnish effective sales co-operation. Write for the Ray-Glo story!

RAY-GLO CORPORATION

Athens, Ohio

NEMEC
BURNERS
FOR ALL REQUIREMENTS
NEMEC combustion ENGINEERS
WHITTIER — CALIFORNIA.

The NO-OX-ID MASTER COAT

The NO-OX-ID Master Coat consists of four elements:

(1) Dearborn Pipe Mill Coat. This coat is to give protection to pipe in transit.

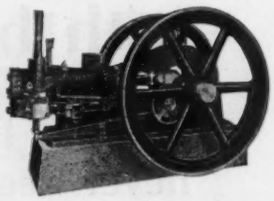
(2) NO-OX-ID "G" Special, the rust preventive unequalled which combines chemical rust inhibition and mechanical soft non-drying protection.

(3) NO-OX-ID-IZED Wrapper is supplied in a form complying with the requirements of the job. Applied spirally.

(4) NO-OX-ID Service Coat gives a film effective in resisting soil stress which does not become hard and brittle on aging.

Recommendations and estimates supplied gladly.

Dearborn Chemical Company
LOS ANGELES:
807 Mateo Street Phone TRinity 3385
SAN FRANCISCO:
421 Bryant Street Phone DAvenport 658



Hey—! You Gas Men—! Wake Up!

If some other power is better than Gas Engine Power, why don't you use it to pump gas through your pipe lines?

Charter Gas Engines will save your customers as much on their power cost as your gas engines save you.

If you were paying power bills proportional to the average private citizen, could you pump gas 1000 miles through a pipe line profitably?

Remember!

One average size Gas Engine will burn as much gas as 50 residences; besides, you need this Industrial Load to balance your demand.

Charter Heavy Duty Slow Speed Engines are made in sizes 25 to 200 H.P. and our prices are low. Write for our **Educational Bulletin No. 23**—It answers about every question you could think to ask about Natural Gas Engine Power.

CHARTER GAS ENGINE CO.
Sterling, Ill., U. S. A.
(Makers of dependable gas engines since 1880)

TAPPAN
Supremacy

is not a newly-won achievement, but an old and accepted standing in the eyes of gas appliance men and the public alike. No other gas range combines so many outstanding superiorities into such a perfect whole—the TAPPAN Insulated Oven gas range.

H. R. Basford Co.
665 Howard St.
San Francisco

H. R. Mayer
1001 E. 1st St.
Los Angeles

F. W. Schwab
2512 N. Stevens
Tacoma

Changes in Worthington Pump and Machinery Corp. Personnel

The following appointments have been made by the Worthington Pump and Machinery Corp., of Harrison, N. J.

E. W. Hammond, formerly located at Buffalo for the company, has been transferred to Los Angeles, Calif., as special representative of Diesel and gas engine sales on the Pacific Coast.

A. M. Boehm has been transferred to Kansas City, Mo., as gas and Diesel engine specialist. Mr. Boehm was formerly with the sales department at Buffalo.

G. A. Herrmann, formerly sales engineer at Chicago, has been appointed acting district manager at St. Paul, Minn., and W. R. Kennedy, sales engineer at Pittsburgh, has been appointed acting district manager at Kansas City.

City of Long Beach to Own and Operate North Long Beach System

The Southern California Gas Co., Los Angeles, has been authorized to sell, and the City of Long Beach to purchase the gas distribution system in North Long Beach for the sum of $300,000, plus the cost of additions and betterments made by the Southern California Gas Co. between December 31, 1930, and September 14, 1931. The properties involved in the transaction consist of those operated by the Southern California Gas Co. in the Long Beach Boulevard, Gateway Park and Greater Long Beach annexations. About 4,500 meters are included in the transaction.

Bulletin on Specialty Insulation By American Lava Corp.

American Lava Corp., Chattanooga, Tenn., has just brought from the press a new bulletin on "Lava and Magnesia, Specialty Insulation." The bulletin is styled Catalog No. 32, and deals with lava for industrial gas burners, burner heads and tips, pilots, caps, etc., and with magnesium oxide for specialized industries. The booklet is attractively prepared and well illustrated. Copies may be obtained by writing the company at the above address.

Naval Training Station at San Diego Installs Gas

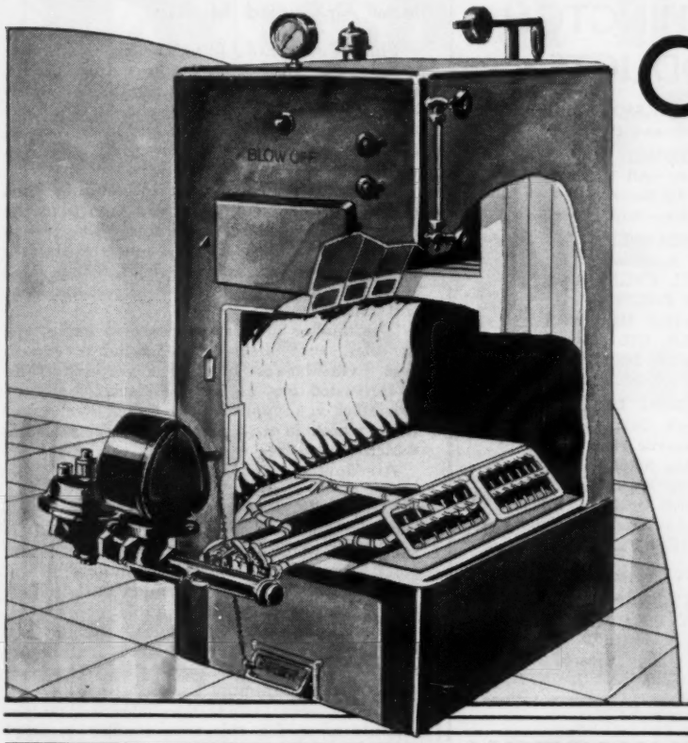
San Diego Consolidated Gas and Electric Co., San Diego, Calif., recently completed a gas installation at the United States Naval Training Station at San Diego, where meals are served for 1237 men. Additional buildings now under construction at the station will also be equipped for gas. The station formerly used oil as fuel. Gas service has also been installed at the rifle range of the United States Marine Corps northeast of La Jolla, replacing coal.

Norborne, Mo., to Have Gas Service from Carrollton Line

An extension of the Cities Service Gas Co. line from Carrollton, Mo., to Norborne, 10 miles distant, was begun September 7, and was expected to be complete late in the month. The system will be operated by the Ozark Distributing Co., with district headquarters at Carrollton.

38,000,000 c. f. Well in Otis Field

Haskin Drilling Co., Cushing, Okla., is reported to have brought in a 38,000,000 cubic foot well in the Otis field in Kansas recently.



Converted by Gas

"Modern Heating Makes Modern Homes" and Barber Automatic Jet Gas Burners are the zenith of modern heating.

They convert any hot water, steam or furnace system into clean, economical, completely automatic gas heat.

They are simple in construction, accurate in design, low in first cost and low in operating cost.

Barber Automatic Jet Gas Burners make dark and dirty basements into sparkling, healthful rooms. They free the home owner and the housewife forever from the drudgery of the shovel, the storage of fuel and the possibility of sickness from inefficient heat.

Sell Barber Automatic Jet Gas Burners NOW. The public wants AUTOMATIC heat and it wants YOU to sell it. Take on the Barber line now.

Remember we give you every possible selling help. Merely send us the Manufacturer's Name, the Trade Name and Number of the Boiler or Furnace—and you will be certain of a tailor-made Barber Burner for every job.

Write today for complete details on how Barber helps you make AUTOMATIC heat sales easy!

Nothing to replace in any system. Simply install the correct Barber Burner!

BARBER
Automatic Jet Gas
BURNERS

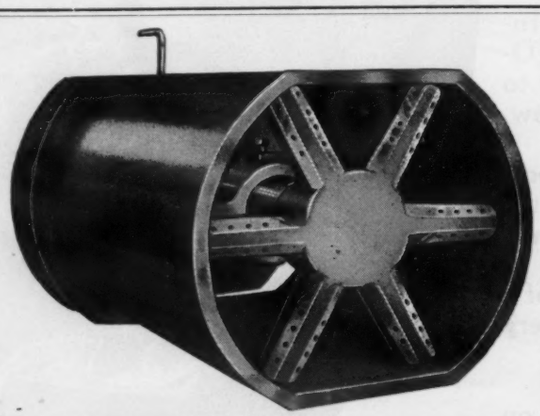
The Barber Gas Burner Co.

3702-4 Superior Avenue CLEVELAND, OHIO

Specify
WALWORTH
VALVES
FITTINGS
AND TOOLS
for
GAS
WALWORTH
General Sales Office
60 E. 42nd St., New York
WALWORTH CALIFORNIA CO.
235 Second St., San Francisco
WALWORTH COMPANY
809 Fourth Place, Los Angeles

WORTHINGTON
PRODUCTS
COMPRESSORS
Stationary and Portable
PUMPS
All Sizes—All Types
For All Services
Any Capacity—Any Pressure
CONDENSERS
and Auxiliaries
DIESEL ENGINES
GAS ENGINES
FEEDWATER HEATERS
WATER, OIL and
GASOLINE METERS
MULTI-V-DRIVES
ROCK DRILLING EQUIPMENT
Rock Drills
Automatic Heat
Treating Machines
Forging Furnaces
Drill Steel
Accessories
CHROMIUM PLATING
Literature on request
WORTHINGTON PUMP AND
MACHINERY CORPORATION
Works: Harrison, N. J.; Cincinnati, Ohio;
Buffalo, N. Y.; Holyoke, Mass.
GENERAL OFFICES: HARRISON, N. J.
District Sales Offices or Representatives
in Principal Cities
WORTHINGTON
G-85

GAS
BURNERS
For
ALL INDUSTRIAL
PURPOSES
JOHN ZINK CO.
Oklahoma Natural Gas Bldg.
Phone 4-9838
TULSA, OKLAHOMA
★
Flameless Burners
Flame Burners
Short Flame Burners



It *Is* Important
Space Heater Radiants
Back Walls
Tunnel Radiants
Leaning Baffles
Radiant Sticks
Burner Tips
Skeleton Cups
to know that the refractories you use in your gas appliances are the best obtainable. Be sure they are; specify GENCERACO REFRACTORIES and know you can get none better. Ask for a quotation, today.
GENERAL CERAMICS COMPANY
71 West 35th St., New York, N. Y.

Fluor Corp., Ltd., Announces New Air-Cooled Muffler

Fluor Corp., Ltd., Los Angeles, Calif., announces the adaptation of the induced draft, air-cooled muffler principle for internal combustion engines, in compressor station construction, following two years of successful experimental work on 2-cycle and 4-cycle gas engines of various horsepowers.

The exhaust line from the engine runs under the floor in an enclosed trench to the muffler pot outside of buildings. The trench is covered with a precast concrete slab to prevent vibration and a sheet metal hood surrounds the exhaust stool to direct and control inlet air.

The muffler proper consists of a baffle type cylinder, suspended to accommodate expansion. Gas leaves the muffler vertically, and is exhausted into an outside stack. The outside stack is supported on a bolted steel cover plate which in turn covers a concrete box in which the muffler is suspended.

Air flow induced in the outside stack follows the exhaust line from the engine, through the concrete box and out. The cooling effect is extremely efficient as all heat is conducted away from the engine room and stack temperatures run approximately 50° F. under water cooled stack temperatures. Back pressure is practically negligible.

Dimensions of pipe, conduit, muffler and box and inside and outside stack are important in their interrelation to insure proper cooling with minimum back pressure.

The primary advantages claimed by the manufacturer for this type muffler are (1) quiet operation, (2) elimination of use of water, (3) positive engine room ventilation.

Electrolux School for Lone Star Subsidiaries on Sept. 8-9

An Electrolux School for gas refrigerator service men and salesmen of the Dallas, Community Natural, Municipal, Texas Cities, and Fort Worth gas companies held in Dallas September 8 and 9 was attended by more than 30 men. The school was conducted by C. E. Johnson, service promotion manager from the Electrolux factory, and R. P. Haskin, district representative with headquarters in Dallas.

A banquet for those who attended the school was held on September 9. Short talks were made by Mr. Johnson, Mr. Haskin, and C. K. Patton, gas sales manager of the Dallas Gas Co.

Southern Calif. Gas Co. Plans Addition to Van Nuys Office

Southern California Gas Co., Los Angeles, plans to erect an addition to its district office at Van Nuys, giving a larger display space, as well as more room for equipment and offices.

H. M. Cummins to Head St. Johns District for Portland Gas & Coke Co.

H. M. Cummins has been appointed representative of the Portland Gas & Coke Co. of Portland, Ore., in the St. Johns district. He succeeds G. E. Healy who has been transferred to the Rose City Park district of the company.

New Line to Sweetgrass, Mont.

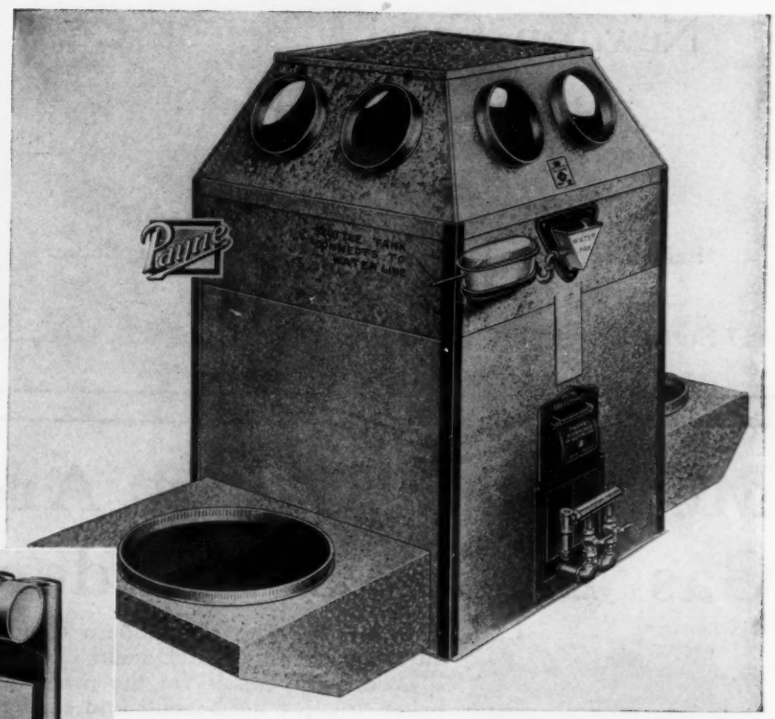
Consumers Gas Co., Great Falls, Mont., has completed construction of a gas transmission line from the Kevin-Sunburst field to Sweetgrass, assuring the town an adequate supply.

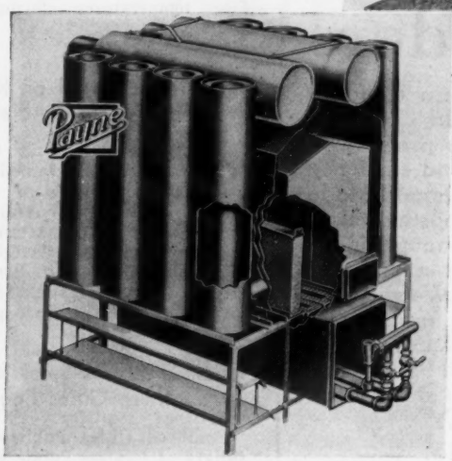
ush a button! Set a clock! Heat this simple scientific way! No dust! No ash!

PAYNE

Central Furnace

Gas Heating in its simplest and most economical form! Easy to install, economical to operate. Correct design provides uniform winter heating, convenient control (push button or thermostat) and automatic humidifying for dry climate if desired.





Here is a high efficiency gas-fired furnace for reducing the cost of your warm air heating installation — made by the world's largest manufacturers of gas furnaces exclusively. Approved by A. G. A. Testing Laboratories. Write for new Bulletin 6-B — just out!

PAYNE FURNACE & SUPPLY CO., INC.

BEVERLY HILLS, CALIFORNIA

Payne Heat

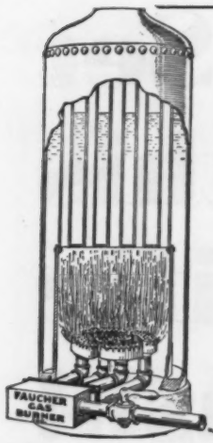
Unit Furnaces
Floor Furnaces
Central Furnaces
Industrial Installations
Pipeless Wall Units
Factory Units

Payne Engineering Service

Architects, Building Contractors and Heating Engineers are invited to put their troublesome warm air heating problems up to Payne Engineers. Send floor plans and full details of heating requirements. No matter how large or how small your installation may be, the Payne Furnace & Supply Co., Inc., is ready to cooperate with you.

Payne

THERE IS A "PAYNE HEAT" SYSTEM FOR EVERY BUILDING AND CLIMATE



101-B Faucher Gas Burner applied to 6 H.P. Upright Boiler

Proven very efficient and economical. Also excellent for varnish kettles. Operates noiselessly.

FAUCHER GAS BURNER, INC.

P. O. Box 5031 DALLAS, TEXAS

Newman Gas Equipment Co.

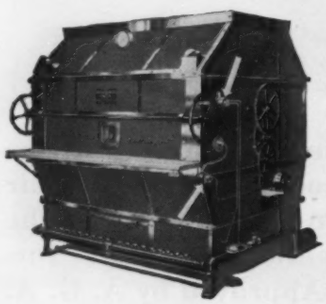
Industrial and Commercial Burners

Upshot Burners for Ideal Boilers

Bailey Regulators for Gas Fuel and Pressure Regulation

447 Sutter Street San Francisco Ph. GA 7833

McDonald Ovens Are Gas Business Builders



In keeping with the modern trend in all lines, the Bruce McDonald Company is making it possible for the progressive baker to enjoy the benefits and efficiency of gas heat. The 1931 McDonald-Made Meek Reel Oven has thermostatic heat control and is economical enough in its fuel consumption to make it a practical oven for the average baker. We will help you sell the bakers in your community on burning gas. Send for complete information. Use the coupon below.

BRUCE McDONALD COMPANY

Also Manufacturers of **RED DEVIL OVENS**

Kansas City, Mo.

(Warehouse stock and branch office in Los Angeles)

BRUCE McDONALD CO.
2019 Washington St.
Kansas City, Mo.

Please send me complete information on McDonald-Made Meek Reel Ovens and on Red Devil Cabinet Ovens.

Name .....
Firm Name .....
City ..... State .....

27.3 Per Cent Reduction in California's Gas Wastage

FIGURES compiled by Claude C. Brown, gas and electric engineer for the Railroad Commission, show that there was a reduction of 27.3 per cent in the production of natural gas in California during the first six months of 1931, and a reduction in the wastage of 61 per cent, as compared with the first six months of 1930.

Following are the figures in cubic feet, showing the production, utilization, wastage and sales to gas companies for the first six months of 1931 as compared with 1930:

Total production 1930	288,949,200,000 cu. ft.
Total production 1931	209,976,300,000 cu. ft.
Total utilization 1930	156,679,100,000 cu. ft.
Total utilization 1931	158,696,700,000 cu. ft.
Total wastage 1930	132,270,100,000 cu. ft.
Total wastage 1931	51,279,600,000 cu. ft.
Percent utilization 1930	54.3
Percent utilization 1931	75.6
Percent wastage 1930	54.7
Percent wastage 1931	24.4
Sold to gas co.'s 1930	66,999,300,000 cu. ft.
Sold to gas co.'s 1931	79,502,600,000 cu. ft.
Reduction in prod. 1931	27.3%
Reduction in wastage 1931	61.0%

Report on Ocean Temperatures As Indices to Gas Consumption

A. F. Gorton, associate in meterology at Scripps Institution of Oceanography of the University of California, La Jolla, Calif., announces the completion of a preliminary report on ocean temperatures as indices of atmospheric temperatures and domestic gas consumption during the winter season, as affecting the southern California area.

The report concluded that the general trend of gas consumption parallels that of temperature, and that atmospheric temperatures in southern California during fall and winter, and hence consumption of gas for domestic heating, are in a rough way predictable from a knowledge of La Jolla surface temperatures during the preceding quarter.

Extension Granted on Kennewick Franchise to N. W. Natural

Northwestern Natural Gas Co., Seattle, Wash., has been granted an extension of time on its franchise to serve Kennewick, Wash. The company is drilling a well eight miles distant from the town, and will serve gas from that well should a supply become available. Wells in Benton County will supply the town should drilling operations on the nearer site fail to produce gas.

Increase in Gas Sales Reported by Southern Cities Public Service

Southern Cities Public Service Co., subsidiary of Central Public Service Corp., Chicago, announces a gain in gas sales in July, 1931, of 47.72 per cent over July of 1930. In cubic feet, the increase amounted to 155,337,300.

Extend Baker, Mont., Gas Field

The Baker gas field in eastern Montana was extended six miles during the last week in August, with the bringing in of a 18,000,000 c.f. well by the Cedar Creek Oil & Gas Co. The gas will be purchased by Minnesota-Northern Power Co.

Sensitive Bellows Thermostat

Complete assembly unit of balanced construction. Protected against abuse or straining due to over-expansion. Large movement per degree of temperature change. Responds instantly to change in temperature.

Self Aligning Valve Construction

Easily removed for cleaning, if necessary. Large capacity with extremely low pressure drop.

Heavy Valve Casing

Accurately machined. High pressure type valve rod. Serves as base for assembly of complete Wilcostat. Incorporated by-pass adjustment and pilot light-outlet.

Decorative Cover

Liberally ventilated to insure free circulation of air at actual room temperature. Attractive lines. Easy to keep clean.

THE WILCOSTAT AUTOMATIC ROOM TEMPERATURE CONTROL

A NEW Accessory to Help Sell More Gas-Fired Space Heaters

The Wilcostat gives homes heated with gas-fired circulators the automatically "right" Winter temperature that makes a home or office really comfortable.

This simple but accurate instrument in the gas feed line ends the waste and constant bother with regulating that is so annoying—and so unnecessary.

The Wilcostat maintains any desired temperature between 58 deg. and 82 deg. F. within 1 deg. F. of the setting. Requires no electrical connecting or flexible gas piping. No maintenance.

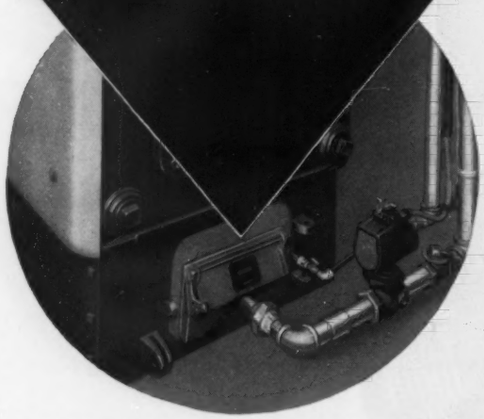
The Wilcostat is easy and economical to install on new or existing heaters, and will save its cost in eliminating waste the first season.

Forward-looking manufacturers and distributors are invited to get the full story about the perfected Wilcostat. Made in 3/8", 1/2" and 3/4" pipe sizes. Prices on application.

THE WILCOLATOR COMPANY, Newark, N. J.

Specialists in Temperature Control for Household Appliances

THERE IS A CECO GAS BURNER
for HOME, BUSINESS BLDG., POWER PLANT, REFINERY and INDUSTRIAL PROCESSES



Gas companies who recommend CECO Gas Burners to their patrons are sure of customer satisfaction . . . for the purchaser of a Ceco has as his guarantee of satisfactory performance the skilled service of combustion experts. Whether it's for heating or industrial use, you'll find a Ceco Burner especially designed to give the most economical, the most dependable operation. Illustrated Bulletins will be sent promptly on request.

COMBUSTION EQUIPMENT COMPANY
GENERAL OFFICE: KANSAS CITY, MO.
WICHITA MEMPHIS LITTLE ROCK HOUSTON

For smart living... this exclusive apartment hotel in the heart of the famous Wilshire District, overlooking beautiful Westlake and Lafayette Parks.

Rates on Application

L. C. Reed, Manager

The Arcady
2619 WILSHIRE BLVD.
LOS ANGELES

New Low Rates in HOLLYWOOD

$3 ROOM WITH BATH
$4
$5

Right in the heart of Hollywood—with interesting places to go—people to see and things to do.

Write for Booklet. Vacation Bureau

ROOSEVELT HOTEL
E. J. CALDWELL, Manager
HOLLYWOOD, CALIFORNIA

Catalog Descriptive of 30 Types of Nordstrom Valves

A 172-page catalog, illustrating approximately 30 types of Nordstrom lubricated plug cock valves, has just been issued by Merco Nordstrom Valve Co., 343 Sansome St., San Francisco. The catalog lists various types of valves made in different metals for handling different liquids, semi-liquids and gases, both neutral and acid. The catalog also lists steam jacketed valves, remote control valves and types with multi-ports, both in low and high pressure. Valves manufactured of bronze, aluminum and Mercalloy for handling corrosion-resistant liquids are also shown, and the catalog is illustrated with views showing installations in approximately 20 industries.

Public Service Corp. of Texas Under Receivership

The Public Service Corp. of Texas, Fort Worth, serving 12 cities and towns in Oklahoma and Texas with natural gas, was recently placed under a receiver upon application of a creditor. M. R. Carb of Fort Worth, Texas, was appointed as receiver. Oklahoma cities served by the Public Service Corporation of Texas are Shattuck, Gage, Fargo and Supply. Texas towns include Canadian, Perryton, Miami, Spearman and Follette.

Oklahoma Natural Gas Corp. in New Oklahoma City Offices

The Oklahoma Natural Gas Corp., Tulsa, Okla., on August 31 opened new offices and operating headquarters in the Key Building in Oklahoma City. The company occupies the first and most of the second floors of the building. A formal opening of the new quarters is soon to be held by the company.

Commission Upholds Rates of Canadian Western Natural

The Alberta Public Utilities Commission recently handed down a decision in which the rates of the Canadian Western Natural Gas, Light. Heat & Power Co., Ltd., at Calgary and Lethbridge, Alberta, were upheld. A hearing was held in May, at which time the Commission reserved its judgment.

Peoples Gas Light and Coke Co. Offers Rights to Stockholders

Peoples Gas Light and Coke Co., Chicago, Ill., is offering rights to stockholders to purchase additional stock at par up to 10 per cent of their present holdings. The company has asked permission of the State Commerce Commission to issue $7,900,000 par amount of additional stock.

Central Public Service Co. Reports Gas Sales Gain

Central Public Service Co., Chicago, Ill., reports a gain of 15.3 per cent in gas sold for the first half of 1931, as compared with the first half of 1930.

New York Oil Reduces Rates in Lander and Riverton

New York Oil Co., Casper, Wyo., announces a 10 per cent reduction of its rates for natural gas service in Lander and Riverton, Wyo.

THE GAS INDUSTRY *FORGES AHEAD*

as progressive builders choose

GAS REFRIGERATION!

ELECTROLUX KEEPS GAS IN THE LIMELIGHT OF PUBLIC ATTENTION—

DEMONSTRATES ADVANTAGES OF GAS TO BOTH BUILDER AND TENANT

Mr. Bernard Noonan, builder of Noonan Plaza.

YOU'D EXPECT AN APARTMENT LIKE THIS TEN YEARS FROM NOW—*but here it is today! Noonan Plaza, 105-145 West 168th St., N. Y. C. Has 285 apartments—also 14 stores accessible from inside the building—every kitchen has Electrolux.*

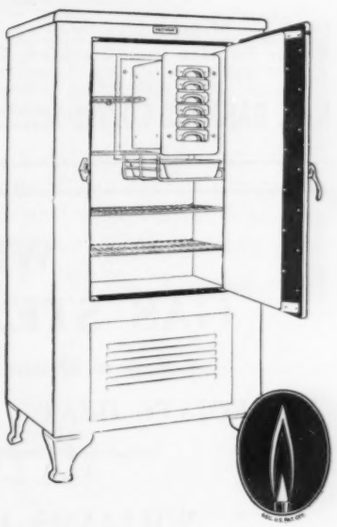
MR. BERNARD NOONAN builds apartments that are not only up-to-date now . . . but will be up-to-date ten years from now. That is why Noonan Plaza, his latest and greatest apartment, has roof gardens with playgrounds for children, co-operative ballrooms, moth-proof storage closets, solariums *and Electrolux Refrigerators.*

Gas refrigeration, the most up-to-date refrigeration, and the idea of gas as a modern fuel have been vividly brought home to Mr. Noonan. And as long as these leaders of the building industry regard gas as the fuel of the future, the gas industry will never take a back seat.

There are 285 Electrolux refrigerators installed in Noonan Plaza . . . 285 good-will builders for the gas industry. During the years thousands of tenants will find these gas refrigerators reliable and efficient. They, too, will have the modern use of gas firmly fixed in their minds. They will become better prospects for gas appliances. Should they buy their own homes, they are more likely to see the benefits of gas heating as well as those of gas refrigeration.

How to reach the apartment owner

To help you influence builders and owners the Electrolux sales department has prepared a carefully worked out plan. This plan as well as more general advertising material is available for the asking. Just write to Electrolux Refrigerator Sales, Inc., Evansville, Ind.



A tiny gas flame takes the place of all moving parts

ELECTROLUX THE *Gas* REFRIGERATOR

The BARTLETT HAYWARD CO.

Designers and Builders

GAS HOLDERS

COMPLETE COAL GAS, CARBURETTED WATER AND BY-PRODUCT PLANTS
SALT WATER and FRESH WATER CONDENSERS
PURIFIERS, STEEL TANKS, FELD VERTICAL SCRUBBERS

Main Office and Works
Baltimore, Md.

Lincoln Building
New York City

New Models!

FRASER CONSOLE
Circulating Heaters

No. 25 25,000 B.t.u.....$49.50
No. 35 35,000 B.t.u.....$59.50

Approved by A.G.A. Testing Laboratory

Write for catalog and prices on these new numbers and on the complete Fraser line.
8 sizes Basement Furnaces
6 Floor and Wall Furnaces
6 sizes Console Heaters

Manufactured by
Fraser Furnace Co.—Stockton, Cal.

Distributed by
H. R. BASFORD CO. San Francisco Los Angeles

COMFORT

Clean, healthful heat instantly with the "Matchless" Electrogas . . . pioneer gas floor furnace . . . five A.G.A. approved sizes.

Electrogas FURNACE

466 Sutter St., San Francisco

WILLIAMS
GAS STEAM RADIATOR

Made in 22 sizes from 26 to 180 feet of rating.

IMMEDIATE HEAT AUTOMATIC LIGHTER

Improved Combustion. Positive Gas Control.

Write for descriptive matter and prices.

WILLIAMS RADIATOR COMPANY

1865-1873 Cordova St. Los Angeles, Calif.

Omaha Smelter Plans to Install Natural Gas Service

The American Smelting and Refining Co., Omaha, Neb., will use natural gas as a fuel, supplied by the Northern Natural Gas Co., from Council Bluffs mains. The city of Omaha uses manufactured gas.

The pipe line will cross from Council Bluffs on the Douglas Street bridge, under a lease covering a long term of years. The pipe will be laid under the floor of the bridge from the Iowa side to within a short distance of the Nebraska side of the river. It then will be curved to the northwest to connect with a steel tower on the smelter property. It will not touch the ground until after it enters the smelter yards. In this way, the line will not have to cross any other private property or city streets.

An attempt to bring natural gas to Omaha was defeated last year, and since that time the smelter has been planning to get it from Council Bluffs. It has been suggested that if other industries in Omaha desire to use this fuel, arrangements can be made with the city to pipe it from the Council Bluffs Gas company.

Where available, all other plants of the American Smelting and Refining Co. are using natural gas, at a great saving. It has been estimated that the annual saving at the smelter in Omaha would be about $25,000. This gas will supplant oil now used.

Coast Counties Gas & Electric Entertains Appliance Dealers

Coast Counties Gas & Electric Co., Santa Cruz, Calif., recently entertained all gas appliance dealers from San Benito, Santa Cruz, Santa Clara, Contra Costa and Monterey counties at a stag barbeque dinner at the company's Big Creek cottage. Guests, in addition to the gas appliance dealers, included Clifford Johnstone, managing director of the Pacific Coast Gas Association, W. W. Green, state president of the California Hardware Association, and LeRoy Smith, secretary and manager of the California Hardware and Implement Dealers Association.

Porter Resigns Post With Shell; Tulin Appointed

A. M. Porter, superintendent of natural gas and gasoline plants for the Shell Oil Co., at Long Beach, Calif., has resigned that position, and will go into the building industry. R. S. Tulin, field superintendent of Shell's gas and gasoline plants, will succeed Mr. Porter in the superintendency.

New Member of Home Service Department for Laclede

Mrs. Rae Banks, who formerly did educational work for the Iowa Public Service Co. of Waterloo, Iowa, has joined the Home Service Department of the Laclede Gas Light Co., St. Louis, Mo., where she is serving as special representative and demonstrator for the Electrolux gas refrigerator.

Rocky Mountain Gas Co. Piping Gas to Meeteetse

The Rocky Mountain Gas Co., Casper, Wyo., subsidiary to Ohio Oil Co., is laying a line from the Buffalo Basin field to Meeteetse in Park County, Wyoming. The line will be 9 miles long and will serve the town of Meeteetse.

Would you like to

INCREASE YOUR HEATING SALES?

YOU can increase your sales by capitalizing on Pacific Gas and Electric Company advertising which appears in your local newspapers. This dominant advertising is designed to send prospects to your store as well as to P. G. and E. offices.

Each P. G. and E. gas heating advertisement carries the line: "Have your Heating Dealer or P. G. and E. submit a proposal to install Gas Heating Equipment."

Prospects who wish to visit a dealer's store will probably say to themselves, "WHICH dealer should I see and WHERE is he located?" The dealer who supplies the answer to that question will benefit many times. You can do this by running a small advertisement in space adjoining that of each P. G. & E. advertisement. Notice the example here.

Pacific Gas and Electric Company carries the bulk of space costs. Its advertisements sell the economy, convenience and cleanliness of gas heating equipment and suggests that prospects visit the dealer's store. Your own advertisement tells these prospects WHERE to buy.

In this miniature reproduction of a newspaper page you see how progressive dealers have tied their advertising in with that of the Pacific Gas and Electric Company.

You can increase your sales, as others are doing, by using this economical method. Just call your local newspaper offices each week and ask which P. G. and E. ad will be published and WHEN. Prepare your own advertisement . . . telling prospects WHERE you are located and which appliance you feature. Your local newspaper will be glad to publish your advertisement in space adjoining that sponsored by this company.

PACIFIC GAS AND ELECTRIC COMPANY

P·G·and E·

Owned·Operated·Managed
by Californians

260-1031 WG

VITEX

The Perfect Gas Vent and Flue Pipe

NOW

MADE
WITH
GLAZED SURFACE
TO
ELIMINATE
ABSORBTION.

WRITE
for fully
descriptive
catalog to

PLANT RUBBER and ASBESTOS WORKS

537 BRANNAN STREET....SAN FRANCISCO

Manufacturers

Classified Advertising

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge. Small professional cards 1-in. deep by 21 ems wide are $5.00 monthly on 12-time contract.

SITUATIONS WANTED—MALE

Accountant and auditor with over 25 years experience, desires position. Applicant is experienced in practical diversified accounting with public utility companies, particularly gas and oil. Can take complete charge of department, and can furnish financial statements and all necessary reports. Will work for a moderate salary and can supply excellent references. Address Box E-151, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Mechanical engineer and draftsman experienced in laying out, drawing plans, and writing construction specifications for gas compressor stations and natural gas absorption plants, also supervision of construction; desires position with company needing qualified man. Applicant's age, 29 years. References and record of experience will be supplied. Available December 1 or before with about one week's notice. Address Box E-161, *Western Gas,* 124 West Fourth St., Los Angeles, Calif.

Manager, aged 34, married, with 10 years experience in public utility operation, desires connection with possibility of future advancement. Capable of managing either natural gas or electric property up to 5,000 meters. Location immaterial. Detailed experience and references furnished. Address, Box E-155, care of *Western Gas,* 124 West Fourth Street, Los Angeles.

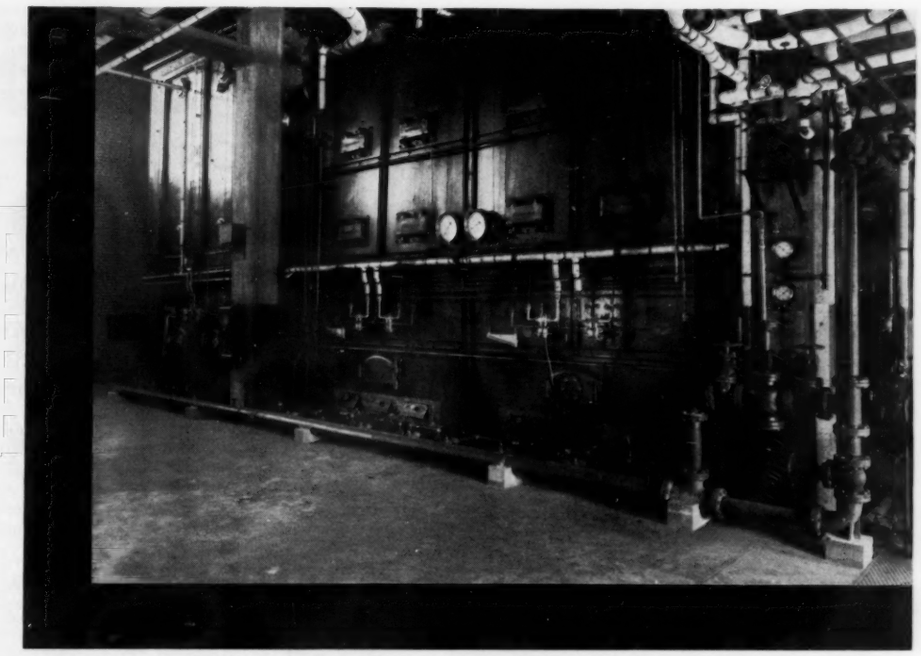
Position wanted as local manager for a natural gas utility. Applicant has had 6 years experience as manager for large gas companies in Texas and Missouri. Will go anywhere. Can also handle merchandising work. Address Box E-157, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Position wanted as manager of gas property, 20 years' experience in coal, water, and natural gas distribution, high and low pressure. Applicant has excellent record as merchandiser. Can report at once. Address Box E-153, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

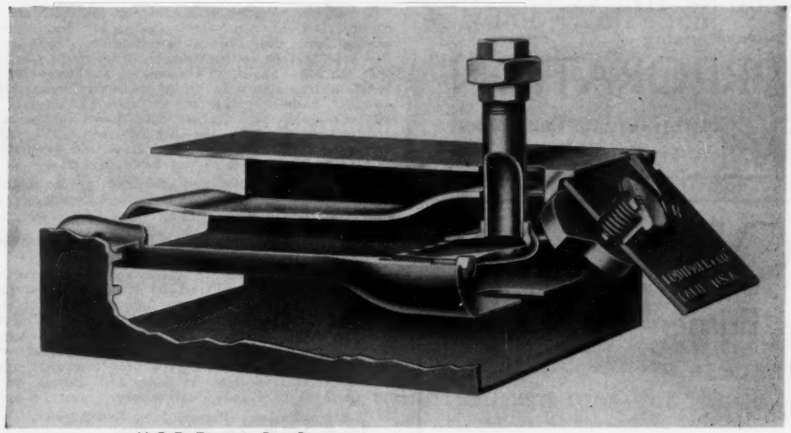
Position desired as franchising agent. Applicant has had successful experience in obtaining utility franchises. Will go any where but is particularly interested in southwest territory. Address Box E-159, *Western Gas,* 124 West Fourth Street, Los Angeles, Calif.

Position wanted by experienced engineer in either natural gas compressor station

Protect Future Revenue

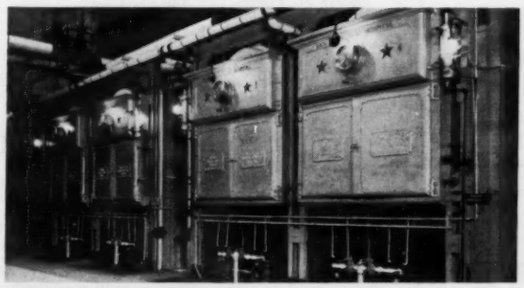


Boilers in Sun Maid Raisin Plant, Fresno, fired with N.G.E. Gas Burners



N.G.E. Type A Gas Burner

Conservation of Gas is focusing more attention on efficiency of GAS BURNERS



A Recent N.G.E. Gas Burner Installation, San Francisco Hospital

Keeping the natural gas customer satisfied over a period of years—meeting the competition of other fuels—increasing the load from present and new users—requires the delivery of maximum value from the fuel, which depends not only upon its inherent advantages, but upon its efficient use through properly designed equipment.

N. G. E. engineers are rendering a highly specialized service to the gas and petroleum industries by analyzing the problems of boiler firing and providing the proper burners. Combustion problems are individually analyzed. The result is:

1st: A perfect application of the right type of burner.
2nd: The most economical installation.
3rd: Satisfaction in service and operation.
4th: Protection under the N. G. E. policy of performance.

There is an N. G. E. Burner for the smallest and largest boiler.

N.G.E. Gas Burners

NATURAL GAS EQUIPMENT, INC.

LOS ANGELES, Petroleum Securities Bldg. SAN FRANCISCO, 1123 Harrison Street
Pacific Coast Distributors for Webster Engineering Co., Tulsa; Surface Combustion Co., Toledo
Montana Distributors: Heating Assurance, Inc. Butte, Mont.

LOOK TO THE PIONEERS FOR CONTINUED LEADERSHIP

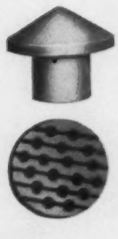
FOR ALL TYPES OF GASES USE

LAVA

AT THE POINT OF COMBUSTION

Pilot Tips
and Burner Heads

Innumerable Styles Are Being Made by Us for Gas Appliance, Oil Burner and Industrial Equipment Manufacturers.



Industrial Lava Gas Tips for Pipe Burners

FOR ARTIFICIAL U.S. Pat. No. 1990644 TYPE-C

Specify ALCO Type-N Tips, in four sizes, for Natural, Butane and other high B.t.u. gases.

ALCO Type-C Tips have been designed for use with artificial gas and are available for use with this fuel in various standard sizes or any special sizes.

FOR NATURAL U.S. Pat. No. 1769881 TYPE-N

Have You Our New Gas Booklet No. 31?

Lava is non-corrosive and non-carbonizing

AMERICAN LAVA CORPORATION

25-29 William St. Chattanooga, Tennessee

Visit Our Display at Atlantic City Next Month.

BITGOOD

Multiple Jet Gas Burners
Industrial Furnaces

SAN JOAQUIN BURNERS

Prat Daniel Thermix Stacks and Air Heaters
Bigelow-Liptak Suspended Arches and Walls
North American Burners and Blowers

F. S. BITGOOD, Inc.

Furnace and Combustion Engineers

Los Angeles Portland San Francisco

Gentlemen:
Kindly send me a sample
can and full details regarding

A-B Vit

The New Porcelain Enamel Cleaner

Name.....

Company.....

Address.....

No obligation, of course
Clip and mail today to

A-B STOVE CO., Battle Creek, Mich.

or gasoline plant. Applicant has had over 8 years experience in both plant operation and construction, and would prefer to locate in the Western area, but will go anywhere. Address Box E-149, *Western Gas*, 124 West Fourth Street, Los Angeles, Calif.

New "Thermo Safety Pilot" By Milwaukee Gas Specialty Co.

Milwaukee Gas Specialty Co., manufacturer of gas appliance accessories, has brought from the press a pamphlet on "Safety for Every Gas-Fired Appliance," featuring the Thermo Safety Pilot. The new pilot utilizes the bunsen flame principle and is said to consume about 1 cubic foot of gas per hour. It is constructed of casting with a "Thermetallic" control of laminated nichrome steel alloy which actuates the shut-off valve. The new device is adaptable to all gases by reaming the orifice to the diameter required. Copies of this descriptive pamphlet may be obtained by addressing the company at Milwaukee, Wis.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC.,

Required by the Act of Congress of August 24, 1912, of *Western Gas*, published monthly at Los Angeles, California, for October 1, 1931.

State of California,
County of Los Angeles—ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared Jay Jenkins, who, having been duly sworn according to law, deposes and says that he is the publisher of *Western Gas*, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher—Jay Jenkins, Los Angeles, California.

Managing Editor—Geo. H. Finley, Los Angeles, California.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Western Business Papers, Inc., Los Angeles.
Jay E. Jenkins, Los Angeles, Calif.
James E. Jenkins, Los Angeles, Calif.
George H. Finley, Los Angeles, Calif.
H. Elliott Taylor, San Francisco, Calif.
Craig Espy, New York City.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is..... (This information is required from daily publications only.)

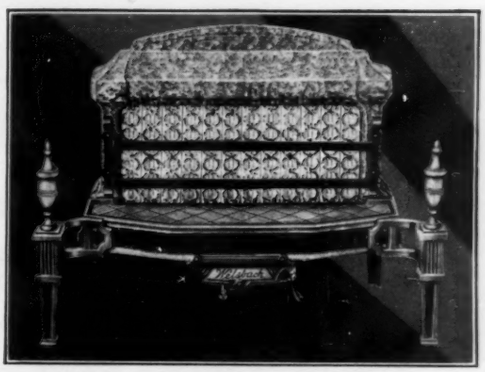
JAY JENKINS, Publisher.

Sworn to and subscribed before me this 21st day of September, 1931.

(SEAL) JOSEPHINE C. WHITING,
Notary Public.

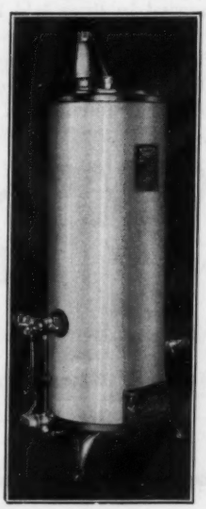
(My commission expires March 25, 1932.)

Time proved value is of Key Importance in these days of Careful Buying



THESE are days of careful buying. Close scrutiny of value is the rule . . . And the name Welsbach, backed by 40 years of earned leadership in the gas appliance field, is recognized by Commercial Managers more fully than ever before as a definite factor in making sales... **Welsbach Radiant Heaters** are outstanding because of their original design and fine finish—yet are moderately priced . . . Welsbach quality is revealed in every detail of their construction.

Welsbach Water Heaters have gained their leadership through their efficient performance (and favorable prices). In fact there is not a single detail of any Welsbach appliance that will not bear close examination by today's buyers. When Welsbach gas appliances are featured, profitable sales are sure to result.



Member of American Gas Association

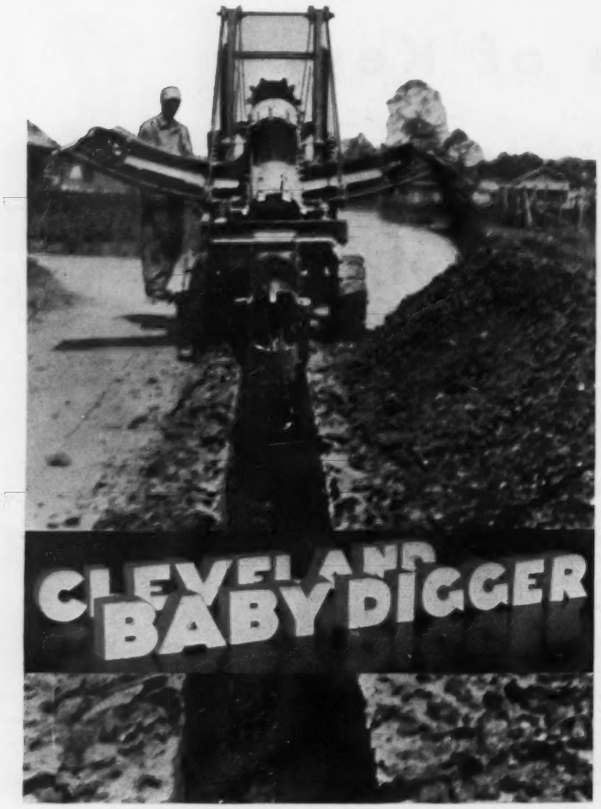
WELSBACH COMPANY

GLOUCESTER CITY, N. J.

Offices in Principal Cities

50 Hawthorne Street, San Francisco
226 South Wabash Avenue, Chicago, Ill.

"Tailor-made" to fit the GAS TRENCH JOB



THE Cleveland Baby Digger is especially constructed to meet gas trench requirements — in fact Public Utilities now using it, find that it is unequalled for downright usability. It handles profitably even the small 80 and 100 foot city and suburban extensions, continually being laid, as well as the longer and larger lines of main.

Extremely compact, only 58" wide, giving you all the advantages of machine trenching in confined areas; **exceedingly mobile,** weighing but 4 tons, easily and quickly transported at truck speed; **amply powered** for the toughest digging; and **ruggedly built,** of the finest materials, the Baby Digger has proved to be the indicated machine for gas trench excavating. Write today for full information.

Shows the Baby Digger being loaded under its own power on its improved trailer for truck speed transportation.

The CLEVELAND TRENCHER Co.

"Pioneers of the Small Trencher"

20100 St. Clair Ave. Cleveland, Ohio

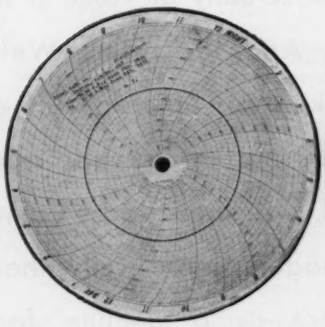
Distributed by Edward R. Bacon Co., San Francisco, Calif.

XX

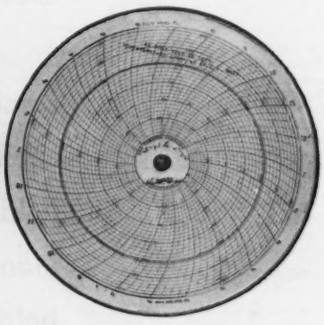
DOUBLEX SIMPLEX CAST IRON PIPE

XX

Carries High Pressure Gas In Leak-Proof Lines Laid By Green Crews As Rapidly As 1100 Feet Per Hour



Perfect Circle at 50-lb Gas



Perfect Circle at 105-lb Gas

THESE charts of final tests on recent installations of Doublex Simplex Cast Iron Pipe lines recording "perfect circles" on pressures ranging from 50 to 105 pounds, may strike you as remarkable. They are, when judged by obsolete ideas of the pressure-carrying abilities of cast iron pipe and joints for gas service. They are not, when judged by results of accurate tests (made at our plant) which indicate that Doublex Simplex Cast Iron Pipe and the Doublex Simplex Joint are quite capable of carrying pressures exceeding 600 pounds! These installations *are* noteworthy, however, in that these pressures were carried in lines laid by green crews at laying speeds attaining 1100 feet per hour! Have you received a copy of our "Folder DX931" which describes those installations in detail? If not, address nearest Acipco office and you will receive a copy by return mail.

AMERICAN CAST IRON PIPE COMPANY

BIRMINGHAM, ALABAMA

SAN FRANCISCO
DALLAS
NEW YORK CITY

CHICAGO
MINNEAPOLIS
SEATTLE

KANSAS CITY
LOS ANGELES
CLEVELAND

1031G

Here's a strong selling point that applies only to

(Patents Pending)

No. 603-C... B. T. U. Rating 37,000
No. 602-C... B. T. U. Rating 25,000

Retail Price, $29.80 to $54.50

Full porcelain grained Walnut or baked Russet enamel finish

SPARK
Gas Circulating
HEATERS

"The patented and exclusive Spark Heating Unit produces a *large* volume of WARM, healthful air, instead of a *small* volume of HOT, devitalized air."

We'll be glad to send you a sample heater for testing in your own laboratory, without obligation, and with privilege of returning.

MANUFACTURED BY
Hammer-Bray Co.
Oakland California

SAN FRANCISCO
180 New Montgomery St.

LOS ANGELES
7000 Avalon Boulevard

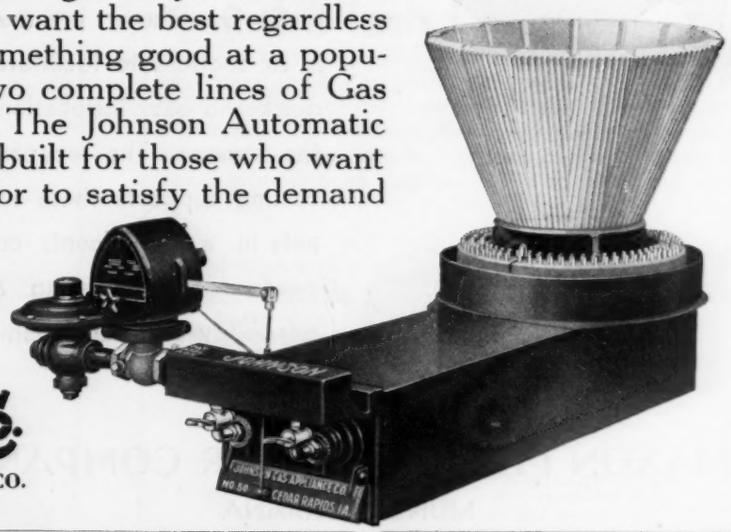
PORTLAND
330 Union Avenue, North

SEATTLE
1016 First Avenue, South

THERE'S STILL TIME
To get your share of this winter's gas heating business

Gas home heating isn't a coming thing—IT'S HERE. There are thousands of home owners who can be sold gas home heating this Fall—if you get busy. There are two kinds of buyers; those who want the best regardless of cost; and those who want something good at a popular price. Johnson has built two complete lines of Gas Burners to cover both classes. The Johnson Automatic Gas Burner for home heating is built for those who want the best—and the Johnson Junior to satisfy the demand for a low priced burner.

There's still time. Write now for complete information on the Johnson Gas Burners for Home Heating.



JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative—C. B. BABCOCK CO.
135 Bluxome St., San Francisco, Calif.

With Insulated Porcelain Enameled Oven

No. 2730 BKCT De Luxe Gas Range
Insulated Oven
Full Porcelain Finish, Ivory and Black, Green and Ivory

WEDGEWOOD

CLOSED TOP

Insulated 16-inch oven and concealed manifold. Cast front and door frames. Stainless, rust-proof, porcelain cooking top. Porcelain oven linings. Concealed door hinges and bolts. Kitchen heater with cooking top gas burner and gas kindler in firebox. Will burn 19-inch wood. Can be fitted with water back. Circulator end panel. Removable two-piece oven bottom. Right or left oven. Standard equipment carried with Rutz lighter, oven heat control and utility drawer.

AMERICAN GAS ASSOCIATION · APPROVED · COMPLIES WITH NATIONAL SAFETY REQUIREMENTS

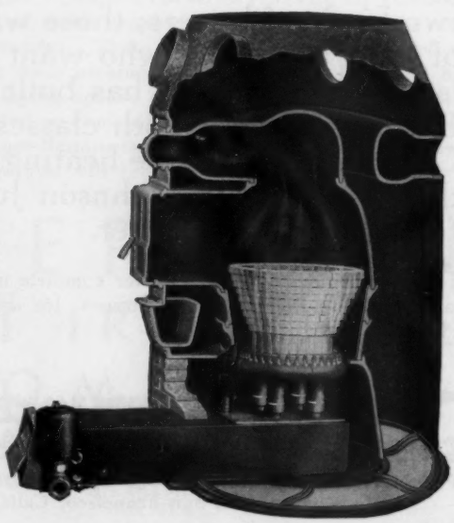
Over a Million Satisfied Wedgewood Users.

JAMES GRAHAM MFG. CO.

Largest Stove Manufacturers in the West
A Pioneer That Is Still the Leader
San Francisco, Newark, Calif., Los Angeles

Corbelled Radiants,

—as used in the Maxon Automatic Gas Burner, are made in six sections to facilitate a quick and easy installation in the furnace. The receptacle casting supports these radiants in a permanent, compact unit, eliminating any possibility of disarrangement and breakage.



This is No. 1 of a series of ads describing the distinctive features of this quality burner.

MAXON PREMIX BURNER COMPANY
MUNCIE, INDIANA

DIRECTORY

Byllesby Engineering and Management Corporation

Wholly-owned subsidiary of Standard Gas and Electric Company

231 South La Salle Street, Chicago
New York Pittsburgh San Francisco

GAS PIPE LINE MAP

Compiled by the Editors of WESTERN GAS—Size 45" x 45"

The most comprehensive published; covers the 22 western states in detail. Gives gas fields, names of natural gas communities; sizes of pipe lines and names of pipe line companies

Prices, $1.50, Heavy Bond Paper; $3.50, Printed on Cloth

WESTERN GAS

124 West Fourth St. Los Angeles, Calif.

If you would keep in touch with the Natural Gas and Butane industries, send a check for $2.00 to

WESTERN GAS
124 West Fourth Street, Los Angeles

Name.....

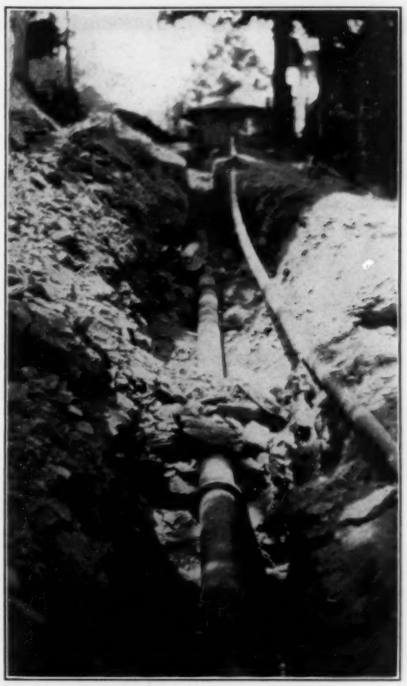
Company.....

Position Occupied.....

Street Address.....

City and State.....

Subscription Rates: 1 Year $2.00; 3 years $5.00; Foreign $3.00 per year



Why not CAST IRON *in the first place?*

Facing that question fairly, in the light of modern McWane-Pacific methods of cast iron pipe making, shows the economies and desirability of laying McWane-Pacific CAST IRON gas pipe in the first place.

You Only Lay it Once

No coating or coddling is required. It cannot rust. Furnished with or without the factory-made joints: "A joint for every pressure."

1¼ and 2 inch Cast Iron Pipe

McWane-Pacific cast iron gas pipe gives you the PERMANENCE of cast iron pipe in small diameters, and with special high-pressure joints. End your pipe-corrosion costs and troubles with it. 1¼ and 2 inches, through 12 inches in size. Long lengths. Write for McWane booklet NOW.

McWANE CAST IRON PIPE CO. BIRMINGHAM ALABAMA

PACIFIC STATES CAST IRON PIPE CO. PROVO, UTAH

NEW YORK 40 Exchange Place
CHICAGO 208 S. LaSalle St.
KANSAS CITY 1006 Grand Ave.
DALLAS 1807 Santa Fe Bldg.
LOS ANGELES 417 S. Hill St.
SAN FRANCISCO 111 Sutter St.
DENVER 226 Continental Oil Bldg.
PORTLAND, ORE. 611 Spaulding Bldg.
SALT LAKE CITY, 149 W. 2nd South St.

Advertisers' Index

The A-B Stove Co. 90
The Alpha-Lux Co., Inc. 72
American Cast Iron Pipe Co. 92
American Gas Products Corpn. 61
American Lava Corporation 90
American Meter Company 7-10
The Arcady 84
The Barber Gas Burner Co. 79
Barber-Greene Company 9
The Bartlett Hayward Co. 86
H. R. Basford Company 86
The Bastian-Blessing Co. 52
Biggs Boiler Works Co. 52
F. S. Bitgood, Inc. 90
The Cast Iron Pipe Research Ass'n. 8
The Chaplin-Fulton Mfg. Co. 72
Charter Gas Engine Co. 78
The Cleveland Trencher Co. 92
James B. Clow & Sons 75
Combustion Equipment Co. 84
Connelly Iron Sponge & Gov. Co. 53
The Cooper-Bessemer Company —
Dearborn Chemical Co. 78
S. R. Dresser Mfg. Company 13
Electrogas Furnace Company 86
Electrolux Refrigerator Sales, Inc. 85
Faucher Gas Burner, Inc. 82
The Fisher Governor Co. 4
The Fluor Corporation, Ltd. 1
Forney Combustion Engr. Co. 76
Foxboro Company 18
Fraser Furnace Co. Inc. 86
General Ceramics Co. 80
General Gas Light Company 63
James Graham Mfg. Co. 94
Groble Gas Regulator Company 51
Hammer-Bray Co. 93
Hydrauger Corporation, Ltd. 16
Johnson Gas Appliance Co. 93
The C. M. Kemp Mfg. Co. 51
P. M. Lattner Mfg. Co. 74
Leahy Mfg. Company 74
Madsen Iron Works 74
Maxon-Premix Burner Co. 94
Bruce McDonald Co. 82
Merco Nordstrom Valve Co. 2nd Cover
Lee B. Mettler Co. 88
Milwaukee Gas Specialty Co. —
Minneapolis-Honeywell Regulator Co. 69
L. J. Mueller Furnace Company 65
National Transit Pump & Machine Co. 15
The National Tube Co. 57
Natural Gas Equipment, Inc. 89
Natural Gas Properties, Inc. 49
Naylor Pipe Company 2
Nemec Combustion Engineers 78
Newman Gas Equipment Co. 82
Pacific Gas & Electric Company 87
Pacific Gas Radiator Company 67
Pacific Pipe & Supply Co. 76
Pacific States Cast Iron Pipe Co. 95
Parsons Engineering Co. 51
Payne Furnace & Supply Co., Inc. 81
Pittsburgh Equitable Meter Co. 3
Plant Rubber & Asbestos Works 88
Ray-Glo Corporation 77
Reliance Mfg. Company —
Reynolds Gas Regulator Company 11
Roberts-Gordon Appliance Corp. 73
Robertshaw Thermostat Company 71
Robinson Orifice Fitting Company —
Roosevelt Hotel 84
George D. Roper Corp. —
Safety Gas Main Stopper Company 14
Wm. B. Scaife & Sons Co. 49
Silica-Gel Corpn. 17
South Chester Tube Co. 12
Sprague Meter Co. Back Cover
Standard Gas Equipment Corp. —
Standard Oil Company of California 53
Surface Combustion Co. 45
Tappan Stove Company 78
Union Oil Company —
United States Pipe & Foundry Co. 5
Wailes Dove-Hermiston Corp. 3rd Cover
Walworth Company 80
Welsbach Co. 91
Westcott & Greis, Inc. —
The Wilcolator Company 83
Williams Radiator Co. 86
Worthington Pump & Machine Corp. 80
The Youngstown Sheet & Tube Co. 6
John Zink Co. 80

IT ALL LEADS TO THIS

BITUMASTIC

REG. U.S. PAT. OFF

ENAMEL

—has been used on *most* of the big oil and gas lines—invariably upon those sections where corrosion is adjudged most severe—because no other coating has proved so effective, under so wide a diversity of conditions, over so long a period of years.

Wailes Dove-Hermiston Corporation

17 Battery Place, New York

Philadelphia	Cleveland	San Francisco	Los Angeles	Chicago
401 N. Broad St.	Union Trust Bldg.	345 Vermont Street	2461 E. 8th Street	20 N. Wacker Drive

Have You Received Your Copy of Our New No. 16 Catalogue?

SPRAGUE METERS

and

Sprague Regulators

Accurate Pilot Measurement
Accurate Volume Measurement

Library of Congress
Periodical Division

Satisfactory

Maintenance cost, first cost, and general results in Manufactured or Natural Gases, High or Low Pressure

SPRAGUE METER CO.

BRIDGEPORT, CONN.

Los Angeles, Calif. San Francisco, Calif. Davenport, Iowa Houston, Texas